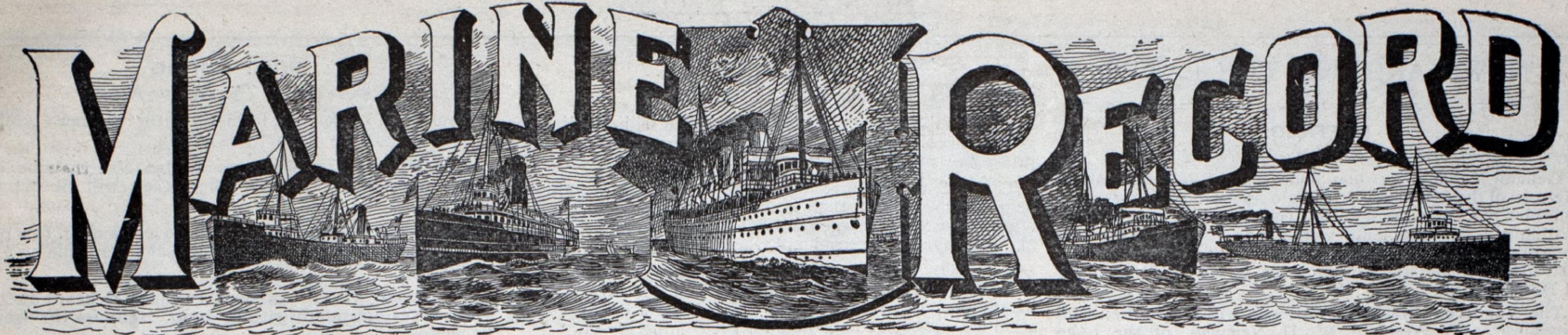


MARINE RECORD



ESTABLISHED 1878.

VOL. XXII, No. 12.

CLEVELAND--MARCH 23, 1899--CHICAGO.

\$2.00 Per Year. 5c. Single Copy

LAKE CARRIERS' ASSOCIATION.

To consider and take action upon all general questions relating to the navigation and carrying business of the Great Lakes, maintain necessary shipping offices and in general to protect the common interests of Lake Carriers, and improve the character of the service rendered to the public.

PRESIDENT.	
FRANK J. FIRTH,	Philadelphia.
1ST VICE-PRESIDENT.	
CAPT. THOS. WILSON,	Cleveland.
SECRETARY.	
CHARLES H. KEEP,	Buffalo.
TREASURER.	
GEORGE P. MCKAY,	Cleveland.
COUNSEL.	
HARVEY D. GOULDER,	Cleveland.

WAGES ADVANCED OVER LAST SEASON.

The executive committee of the Lake Carriers' Association met Saturday, in Cleveland, and decided to advance the wages of all seamen this season, in the aggregate of \$5 per month. The advance was made voluntarily, and was brought about largely by the prospects for better business during the coming summer. It is said that this will have a salutary effect on all wages on the lakes, extending even to the tug men.

At the same meeting the executive committee had under consideration the new bill of lading, but the committee appointed for the consideration of that subject was not ready to make a report, and that matter was held over. A number of complaints from vessel men, asking concessions on account of certain delays at Buffalo, were heard.

The new card of wages for the year shows the monthly salaries of each grade to be as follows:

First class on steamers or those having water bottoms and triple-expansion engines, chief engineer, \$110; second engineer, \$75; first mate, \$80; second mate, \$55; cooks, \$55; helpers to cooks, \$20; firemen, \$35; wheelmen, 35; lookouts, \$35; deck hands, \$20; oilers, \$35; firemen fitting out and laying up, \$1.25 per day and board themselves.

First class on consorts and sail, first mate, \$50; second mate, when carried, \$40; cooks, \$35; seamen, \$35.

Second class steamers or those not included in the first class and wooden vessels, with triple-expansion and with compound engines, except the small boats, which may be put in the third class; chief engineer, \$95; second engineer, \$70; first mate, \$70; second mate, \$45; cooks, \$50; helpers to cooks, \$17; firemen, \$35; wheelmen, \$35; lookout, \$35; deck hands, \$20; firemen fitting out and laying up, \$1.25 per day and board themselves.

Second class on consorts and sail, first mate, \$35 to \$45; cooks, \$30; seamen, \$25 to \$30.

Third class or smaller steamers with high pressure or low pressure engines, covering all boats not included in the two former classes, chief engineer, \$65 to \$80, second engineer, \$55; first mate, \$55 to \$60; cooks, \$45; firemen, \$30 to \$35; wheelmen, \$30 to \$35; lookouts, \$30 to \$35; deck hands, \$20; firemen fitting out and laying up, \$1.25 per day and board themselves.

THE AMENDED LIBEL LAW.

Following is an amendment to the libel law which was passed this session of Congress and became operative March 5:

Be it enacted by the Senate and House of Representatives of the United States of America in Congress assembled, that section 941 of the Revised Statutes be, and the same is hereby, amended to read as follows:

"Section 941. When a warrant of arrest or other process in rem is issued in any cause of admiralty jurisdiction, ex-

cept in cases of seizures for forfeiture under any law of the United States, the marshal shall stay the execution of such process, or discharge the property arrested if the process has been levied, on receiving from the claimant of the property a bond or stipulation in double the amount claimed by the libellant, with sufficient surety, to be approved by the judge of the court where the cause is pending, or, in his absence, by the collector of the port, conditioned to answer the decree of the court in such cause. Such bond or stipulation, shall be returned to the court, and judgment thereon, against both the principal and sureties, may be recovered at the time of rendering the decree in the original cause. And the owner of any vessel may cause to be executed and delivered to the marshal a bond or stipulation, with sufficient surety, to be approved by the judge of the court in which he is marshal, conditioned to answer the decree of said court in all or any cases that shall thereafter be brought in said court against the said vessel, and thereupon the execution of all such process against said vessel shall be stayed so long as the amount secured by such bond or stipulation shall be at least double the aggregate amount claimed by the libelants in such suits which shall be begun and pending against said vessel; and like judgments and remedies may be had on said bond or stipulation as if a special bond or stipulation had been filed in each of said suits. The court may make such orders as may be necessary to carry this section into effect, and especially for the giving of proper notice of any such suit. Such bond or stipulation shall be indorsed by the clerk with a minute of the suits wherein process is so stayed, and further security may at any time be required by the court. If a special bond or stipulation in the particular cause shall be given under this section, the liability as to said cause on the general bond or stipulation shall cease."

The above amendment will have the effect of preventing persons from detaining vessels by making trivial, or, as is sometimes the case, wrong claims against them, for the permanent bond filed by the owner or owners of a vessel will be sufficient security for any claims they may have against her. The National Board of Steam Navigation deserve the thanks of all vessel owners, and especially of those navigating inland waters, for the persistent manner in which they have worked to have this amendment enacted into a law.

PROGRESS ON NAVAL VESSELS.

The chief constructor of the navy has published the following information concerning vessels now building for the navy. There are now actually under construction or already contracted for, 51 vessels of various types, ranging from battleships to torpedo boats. The percentage of completion of the battleships is as follows: At Newport News, Kearsarge, 85; Kentucky, 83; Illinois, 62. At Cramps', Alabama, 76. Union Iron Works, Wisconsin, 63. The sheathed cruiser Albany purchased in England on the stocks, is advanced 80 per cent. toward completion. Of the torpedo boats the Dahlgren, at Bath, Me., stands at 94 per cent., the Fox at 99 per cent., and the Craven at 90 per cent. The submarine boat Plunger is 85 per cent. completed and two tugs, the Penacock and Pawtucket, at New York and Mare Island, 95 per cent.

At the last meeting of Toledo harbor No. 43, Masters and Pilots' Association, a beautiful chair was presented to the harbor by Capt. C. A. Nagle. The presentation was made for Capt. Nagle by Capt. Chas. Maytham, of Buffalo, to Harbor No. 43. Capt. A. A. Stevenson made the acceptance speech in behalf of the harbor. It was a pleasant affair all around and the speeches were to the point, witty and well received.

ENGLISH TORPEDO BOAT TRIALS.

The London correspondent of the Glasgow Herald furnishes some interesting results of trials of torpedo boat destroyers during the year 1898, and in opening his article briefly notes the extent of the progress made with the fleet of boats ordered. There were, he says, forty-two in the first fleet of 27-knot boats, and three of these by White, of Cowes, passed through their trial with about a tenth of a knot to spare, although the power was somewhat abnormal, between 4,800 and 5,070 indicated horse-power. Two, built at Paisley, have yet to pass through the ordeal—they are being fitted with water-tube boilers; and the others have had long periods of commission, and have done well, although water-tube boilers have had to be ordered for some of the first, which had locomotive boilers. Fifty-four faster vessels were ordered, including four of 32 knots or more, the Arab from Clydebank, the Albatross from Thornycroft, the Express from Laird, and the Viper from Fairfield. The other fifty were to steam 30 knots, and of these fifteen have passed through their trial during the year just closed, fourteen succeeded the previous year, and there remain twenty-one of the 30-knot and the four faster boats still to try, of which five have not yet been launched. Last year Laird, Fairfield and Palmer each passed three through their runs. Vickers, of Barrow-in-Furness, Doxford, of Sunderland, and Thornycroft, of London, have each succeeded in the trials of two boats. The power necessary has varied very much. The lowest was with one of Thornycroft's boats, 5,892 indicated horse-power, which gave almost the highest speed got, 30.4 knots; while Vickers, with the Avon, about equaled this with 5,986 indicated horse-power and 30½ knots, the sister boats from the Barrow works doing 30.35 knots for 6,412 indicated horse-power.

The highest power was registered in one of Laird's boats, which developed 7,090 indicated horse-power, and only got a small fraction over 30 knots. Another of the same builder's boats registered 6,848 indicated horse-power for 30.16 knots; but a third made 30½ knots for 6,146 indicated horse-power. Thornycroft's powers are low; the others, with one or two exceptions, range about 6,000 indicated horse-power upwards. The highest speed last year was with the Aerial, Thornycroft's boat, 30.6 knots; next Palmer's Flying Fish, 30.48 knots; Palmer's Fawn, 30.46 knots; Thornycroft's Angler, 30.40 knots; Barrow's Bittern, 30.35 knots; Fairfield's Osprey, 30.31 knots; Laird's Wolf, 30.26 knots; Vicker's Avon, 30.25, and Fairfield's Gipsy and Fairy 30.20 knots. As to coal consumption, the lowest return was in the case of the Aerial, 2.02 pounds; but this was exceptional, and, moreover, extreme accuracy in this respect under the trying conditions is difficult of attainment. As a rule, the slightest fraction under the stipulated 2½ pounds is satisfactory, and in one or two cases it was more, necessitating an extra load, which placed some of the ships at a slight disadvantage as to speed. Two of the 32-knot boats have had frequent preliminary trials, but none have pulled off their speed. The Albatross has done 31¼ with 7,500 indicated horse-power, and it is hoped 32 knots will be got; but it will probably need more than the assumed 8,000 indicated horse-power, which means a piston speed of 1,340 feet per minute, with over 4,000 revolutions per minute. Meanwhile Yarrow has passed through a preliminary trial the first of his Japanese boats, and got 31 knots for a trifle over 6,000 indicated horse-power.

THE sun having crossed the equator bound north, we may now look for some decent spring weather, or at least, such is the general impression. As a matter of science and fact the sun is not bound north. The sun is bound nowhere; it is the center of our universe, although even astronomers talk about the sun's declination, rising and setting, etc., this to the popular belief.

THE MARINE RECORD.

NEWS AROUND THE LAKES.

BUFFALO.

Special Correspondence to The Marine Record.

General Manager Newman and General Passenger Agent Herman of the Cleveland & Buffalo steamship line were in Dunkirk on Wednesday, in consultation with Mayor Williams. Arrangements were made for passenger and freight traffic at that point, and it was officially announced that the Cleveland and Buffalo boats would begin stopping at Dunkirk June 1.

The Vanderbilt system of railroads will be supplied with Pittsburg coal. President W. H. Newman, of the Lake Shore & Michigan Southern, having taken a prominent part in having the contract of 1,500,000 tons divided among the shippers of coal on the Pittsburg & Lake Erie railroad. The contracts are apportioned upon an output basis among the firms of Osborne, Saeger & Co., Morgan, Moore & Baine, H. K. Wick Fuel Co., the Shepler Gas Coal Co., the Johnson Coal Mining Co., and one or two other concerns of lesser magnitude. Consignments on the big contract will not go forward until later in the season, but the close of the deal insures the miners employed by the firms enumerated the busiest season they have ever had.

Appointment of masters of the Lehigh Valley Transportation Co. have been completed. They are as follows:

Steel—Tuscarora, William Williams; E. P. Wilbur, P. McFarlane; Seneca, D. Driscoll; Saranac, J. M. Todd; Wooden—Tacoma, C. E. Fuller; Occanica, James Todd; Clyde, Stephen Lyons; Fred Mercur, William F. Delaney; H. E. Packer, J. A. Whiteside. Official Selection of engineers has not yet been made definitely. Of the masters all are old men with the line, with the exception of Capt. Delaney, who is a new appointment. As an indication that the outlook for the season is better this year than last, comes the statement of Lehigh officials that all the boats of the line will start out immediately after the opening of navigation. Last season none of the wooden boats were put into commission until past the middle of the summer. Nor was there any occasion for their chartering, while the line itself could not supply freight for the boats in use.

The port of Buffalo is growing to such an importance that those interested in the hospital movement think it should have a marine hospital. The number of cases treated in Buffalo is in excess of those treated in Cleveland or Detroit, and is only exceeded at Chicago. Many of the marine associations of that port are back of the movement. The Shipmasters' Association at a recent meeting passed the following resolutions: Whereas, we find there is a movement on foot to enlist the interests of Congress in establishing a hospital building for the use of the marine hospital service at the port of Buffalo, and realizing the urgent necessity for such action on account of the great growth of maritime business at this port, and the consequent increase in the number of cases requiring the care and attention of the hospital service to such an extent that it has outgrown ward space that can be obtained from the hospitals on the contract plan; and whereas, there are at present three marine hospitals on the Great Lakes located at Chicago, Cleveland and Detroit, we find the number of cases treated at Buffalo is largely in excess of treatment furnished either at Cleveland or Detroit, and is only exceeded at Chicago, we feel fully justified in asking Congress to establish a building at Buffalo for the use of the marine hospital service, and thereby solve the problem how sick and disabled seamen of the Great Lakes shall be cared for in the future; be it therefore resolved that Buffalo lodge, No. 1, Shipmasters' Association are in hearty accord with the movement to establish a marine hospital at Buffalo, and will further the movement by all honorable means in their power.

DETROIT.

Special Correspondence to The Marine Record.

Capt. Martin Swain, has again taken charge of the well known wrecking and salvage steamer Favorite, vice Capt. P. L. Millen.

"The long-contested legal fight in the case of the Wilson Transit Co. vs. the steamer George Presley and others, in admiralty, was ended in the United States District Court this week, Judge Swan condemning the Helvetia to pay the damages. The Helvetia collided with the Yakima, which latter vessel was aground. The damages are close to \$6,000. The costs will be adjusted by the attorneys in the case, John C. Shaw and William B. Cady, for the libelants, and Harvey D. Goulder, of Cleveland, for the respondents."

L. C. Waldo, chairman of the Lake Carriers' grain bill of lading committee, says that the joint meeting of this committee and the committee from the New York Produce Exchange, Philadelphia Commercial Exchange, Trunk Line Association, Buffalo Merchants' Exchange, Western Elevating Association, Toledo Produce Exchange, Duluth Board of Trade and Chicago Board of Trade, to finally settle the differences existing over the form of bill of lading in use on the lakes, will be held in Buffalo in the early part of April, if necessary to hold it at all; though it is possible that other amicable arrangements may be made before that date.

MR. REEVES, of Toledo, has begun work on two boilers for the sandbarge Rossford, one for the Mae, building at Craig's shipyard, and two for the Vulcan Iron Works. He has also a lot of work to do on the government steamer Visitor.

CLEVELAND.

Special Correspondence to The Marine Record.

The trouble now is to get material for shipbuilding for vessels already under contract, furthermore, at the increased prices new contracts can't be placed.

The A. & C. line have made quite a number of improvements this season, in their landing facilities at the port, and offices have been enlarged to suit the growing trade, of which Mr. McIntyre is the head and front at the port.

Harvey D. Goulder, Esq., general counsel for the Lake Carriers' Association, is in Montreal, and it is said is there for the purpose of looking into the interests of the association with respect to business for the coming season.

The following invitation has been sent out: "The Globe Iron Works Co. requests you to be present at the launching of the steel steamer M. A. Hanna, built for the Cleveland Steamship Co., on Saturday, March 25, at 2 p. m., standard time. Shipyard, West Old River street." The steamer will be christened by Miss Fanny W. Hanna.

Mr. Robert Logan has returned to town after an absence of several days. I understand that he leaves the city again to-morrow and will not return until early next week. His absence on the Pacific coast had nothing to do with the J. J. Hill, Great Northern or Wolvin deal, rather, that he was simply surveying tonnage on the Pacific coast.

The business to be transacted at Lorain this year promises to be larger than is generally known. Besides the ore which the steel company will receive, the C. L. & W. will ship more coal and receive more ore than ever before. In speaking of the business of the coming season Mr. Pierce, the C. L. & W. agent said: "Our business next year will be larger than ever. We have already contracted with four mills for receiving ore and of this amount I think we will ship about 50 per cent. to the mills direct. The coal business, I have reason to believe, will be very good, and our output will amount to a good many thousand tons."

We understand that Mr. W. G. Mather, president of the Cleveland-Cliffs Iron Co., has bought the controlling interest in the big steel steamer Centurion, and that she will be managed in that office. Several parties were after the steamer and Buffalo parties had an option on her, but let it go when they learned that she was tied up for part of the season. The Centurion was built by F. W. Wheeler of Bay City in 1893, and when she came out she was one of the largest steamers on the lakes. Her net tonnage is 2,728 tons. She was built for the Hopkins Transportation Co., the stockholders of which are nearly all Michigan men. She is fitted for the general freight trade, and is said to be one of the fastest freighters on the lakes. She cost \$265,000.

The pioneer lake sailors are passing away gradually but surely, this week Capt. Rewell, born in 1815, left for the other shore. Captain Cornelius Rewell had about twenty years experience on salt water, and fifty years of lake navigation. He was master of one of the first steamboats trading to Lake Superior, being at that time in the employ of Hanna & Garretson. He retired from marine service in 1877, although for two years thereafter he had charge of the Bradley fleet. Capt. Rewell was one of the oldest Freemasons in the state. He joined the blue lodge when he lived in Sandusky, and when he came here he connected himself with Cleveland City Lodge, of which he was a veteran member. He was also a member of the chapter in Masonry. Mrs. Rewell and two children, Mr. George M. Rewell and Mrs. George R. Warden, survive him. The funeral will be held from the family home Saturday afternoon at 2 o'clock, and it is quite certain that a large number of marine men will pay the last respects to the old seaman.

The Floating Bethel and City Mission Society held its thirty-first annual meeting on Wednesday. No change was made in the officers, and the name of Mr. N. S. Keller was added to the list of directors. A report was made on the work done during the past year, which was very satisfactory. The work done by this institution is a noble one, and it has been instrumental in the building up of many lives which otherwise would have been wasted. The report details many of the instances in which help was given to needy persons, who afterwards became reputable, well-to-do citizens. Some of those who have received help from this society are themselves now doing charitable work. Rev. J. D. Jones, the chaplain and superintendent, has been connected with the society in that capacity for thirty-three years, and is in full charge. A hearty and personal interest is taken by the directors in the work of the society, and Chaplain Jones is the exact man for the place. Moreover it is impossible to conceive how a man could be better fitted for the position. A sailor by instinct and training, also a liberal-minded man with Christian attributes and a heart and a half full of love for his fellow man, in whatever state or condition. The "Floating Bethel," which, by the way is now built of bricks and mortar, is a sure haven and bethel for all in distress.

It is impossible to place a specific date for the opening or closing of navigation on the lakes. The Omnipotent has something to do with it, so also have the marine insurance companies and steel shipbuilders, while owners will earn a dollar or two at all times if the chances are in their favor. The Welland canal opens on April 20 and this is the record for the past decade. Closes December 15. It now appears that the Canadian Minister of Marine has set May 1 as the date for the opening this year, but marine men have petitioned for the opening about April 25. Even the Canadian Minister of Marine is not infallible.

PORT HURON.

Special Correspondence to The Marine Record.

Capt. Geo. R. Bennett, formerly of the steamer Cleveland, will sail the barge Magnet this season.

Wm. Oakes, George Danger and Jas. Nye, marine engineers, have left for Buffalo, where they will fit out their boats.

The Jupiter is receiving a general over-hauling, new plank and everything that is needed to make her come up to the standard.

The sound of the calker's hammer is heard on Black river. Vesselmen are getting boats ready for the opening of navigation.

Parties from Lake Michigan were here looking up a harbor tug, also some large-size tug to convert into a wrecking tug at Escanaba.

The steamer Mary is making regular trips between Port Huron and Algonac. The river is filled with ice between Marine City and Algonac.

Capt. Thomas Currie has purchased of Chamberlain, of Detroit, the tow barge Geo. H. Waud. Mr. Currie now has a first class steambarge and three consorts.

News comes from Au Sable, Mich., that John Ingles has broken all fishing records along this shore, landing 5,500 white fish, pickerel and perch from one seine.

The barge F. M. Knapp is receiving an entire new rail, stanchions, bulwarks, covering board and three new strakes of plank, she will be in as good shape when she comes out as ever she was.

Chief of Police Petit, who is also harbormaster, has notified the owners of vessels in Black river to see that they are securely fastened to the docks. He fears a flood and wishes to prevent accidents of any kind.

The Shipmasters' Association held a farewell party on Thursday evening of this week. It was largely attended and was a highly enjoyable affair. It is expected that the rooms of the association will be closed in about two weeks.

Applications have been made to the St. Clair common council for franchises through that city for an electric railway from Port Huron to Marine City, and it is understood that one of these applications represents men interested in the Port Huron City Railway. It is also reported that these men are working in conjunction with the managers of the Rapid Railway, from Detroit to Mt. Clemens. And still further, that the Rapid Railway has secured control of the Detroit & St. Clair River road, now in operation between Chesterfield and Marine City, which will be equipped with electricity within the next few months. Just now the chances seem to favor the opening of an electric road along the river front southward during the present year, and efforts in that direction should receive every encouragement from citizens of Port Huron.

The captains belonging to the Port Huron Shipmasters' Association will command the following vessels during the coming season:

Wm. Hutchinson, steamer E. W. Oglebay; David Hutchison, steamer Centurion; W. E. Rice, Sand Beach custodian and harbor master; A. C. May, steamer Mecosta; M. A. Budd, steamer Simon Langell; Harry Maitland, steamer Business; Harry Zealand, steamer Mariposa; A. P. Chambers, steamer Manoba; Ezra Davis, steamer Britanic; Geo. W. Pierce, steamer G. W. Roby; Jas. Fleck, steamer Pawnee; Edward Johnson, steamer Newago; Jas. Neil, steamer Mark Hopkins; C. C. Balfour, steamer C. A. Eddy; John Jankins, steamer W. H. Sawyer; R. O'Conner, steamer O. T. Flint; John Sinclair, steamer M. E. Greene; Daniel Sinclair, steamer Maggie Duncan; John McNair, steamer Wyoming, James Barber, steamer M. E. McGregor; A. McGowan, steamer T. D. Stimpson; Geo. A. McLeod, steamer Black Rock; Wm. H. Larabee, steamer Linden; John Bradshaw, steamer Progress; John McLeod, steamer Ocesta; Thos. H. Currie, steamer City of New York; Jas. H. Warwick, steamer Argonaut; Peter F. Powrie, steamer Porter Chamberlain; James Owen, steamer Iosco; John C. Pringle, steamer D. Leuty; Jas. McAllister, steamer Alberta; Edward Anderson, steamer Manitoba; Wm. Cowels, steamer Rhoda Stewart; F. D. Manuel, steamer Westford; F. W. Manuel, steamer Huron City; C. K. Jackson, steamer Nellie Torrent; M. J. Madden, steamer Lizzie Madden; John McArthur, steamer Bulgaria; John Hutton, steamer A. A. Parker; Jas. S. Bennett, steamer Jas. H. Bradley; Harvey Kendall, steamer H. Kendall; John Burns, steamer E. C. Pope; C. T. Brown, steamer Gebhart; Byron Armstrong, to be placed; Henry Davis, steamer Progress; Henry Bennett, steamer S. C. Hall; R. H. Moshier, steamer Glad Tidings; Thos. A. Ellery, steamer J. E. Mills; M. Fitzgerald, steamer Hadley; W. B. Harrow, Thompson tug line Soo; E. W. Haskin, steamer C. H. Davis; George Hardee, to be placed; John W. Gorden, steamer Westford; Joseph Shackett, steamer Wotan; R. P. Thompson, Thompson tug line; A. H. Gains, steamer Aurora; Wm. Smith, steamer P. P. Pratt; J. E. Reynolds, Ogdensburg line; A. M. Elliot, schooner Wayne; N. Little, schooner John Wesley; John Little, schooner Mt. Blanc; J. T. Hanson, steamer Street; A. Cornwall, Innman tug line; F. Halstead, American Steel Barge Co.; Guy Geel, to be placed.

MASTERS AND PILOTS—The members of the Masters' and Pilots' Association will be found on the following boats:

J. W. Montgomery, steamer Kitty M. Forbes; Wm. Montgomery, steamer Robert Holland; J. T. Hanson, steamer Robert Holland; Edward Hendricks, steamer Can-

isteo; T. J. Cartel, steamer Chas. A. Street; Henry Hyser, steamer Miami; Wm. Hayes, steamer Birkhead; E. E. Campbell, schooner Dunford; E. J. Goodwin, steamer Argo; A. Cotton, City of Bangor; A. Cummings, steamer Havana; Cal. Davis, steamer Britanic; J. W. Kelly, steamer Wyoming; H. A. McCannal, steamer Argonaut; Walter Maitland, steamer Centurion; John Shaw, to be placed; Ed. Copeland, steamer Maruba; Wm. Reid, steamer Maricopa; George Bunce, to be placed; Jas. Canally, steamer Oscoda; James Jameson, steamer Maritana; Jas. Cassin, steamer Maggie Duncan; J. E. Reynolds, steamer McVittie; Alex. Jenkins, steamer Mark Hopkins; Chauncey Ney, steamer Mecosta; Chas. D. Brown, steamer John Erickson; H. D. McGowan, to be placed; Melvin Larabee, steamer Linden; Wm. Stevenson, steamer Shenandoah; T. C. Smith, steamer Muskegon; Robert Mouberry, Mitchell Tug Co.

CHICAGO.

Special Correspondence to The Marine Record.

Mr. Jas. A. Myers has severed his connection with C. W. Elphicke & Co., and Mr. H. B. Earhart, formerly of Duluth, has been identified with the firm.

A short account of a social given by the Marine Engineers' Beneficial Association No. 4, of Chicago, will no doubt be read with interest by a number of engineers that subscribe for the MARINE RECORD: Program—Mr. R. Hale and Miss Hagan, song; Miss Bender, song; Prof. Fischel, violinist; Miss Conley, club swing; Miss Bender, song; Miss Inman, recitations. Those present were Mr. Conley and family, William Eddy and wife, W. L. Webster and family, Dr. W. Wise and family, Geo. Grubb and wife, J. K. Rieley and wife, James Grant and wife, Geo. Moe and wife, Mr. Christensen and wife, Mr. Sturges and wife, R. and N. Hale, Miss Hagan, Miss McQuinn, Miss Constant, two Miss Inmans, James Inman, Mr. Richeson, Mr. Foy, Mr. Bender, Mr. L. Walder, Capt. Brine, Dr. Pirnat, Barnard Hendry, P. Navah, Mr. Perry, Mr. Wells and wife, Miss Howard, R. E. Hiles, Mr. Loveland and wife, Mr. West and wife, N. E. Allen, Mr. Reynolds, M. B. Payden, Mr. Hickey. The evening was spent very pleasantly in card playing. The ladies' prize was carried off by Miss Inman, booby prize by Miss L. Hammond; gent's prize by Mr. J. Grant, booby prize by J. Inman. Supper was furnished by Mr. Westerwall, over seventy-five sitting down at the first table.

FLOTSAM, JETSAM AND LAGAN.

Harvey Gallagher, a tug engineer, well known in marine circles at Oswego, N. Y., died on Monday, aged 40 years.

Mr. Reeves, of Toledo, has begun work on two boilers for the sandbarge Rossford, one for the Mae, building at Craig's shipyard, and two for the Vulcan Iron Works. He has also a lot of work to do on the Government steamer Visitor.

With the opening of navigation on the lakes, it is said that the R. W. & O. Railroad Co. is to have the new and fast side-wheel steamer Toronto, plying on the route between Toronto, Charlotte, Oswego, Kingston and St. Lawrence river resorts. This is in opposition to the Richelieu and Ontario line that runs on the north shore. The Toronto is said to be appointed in modern style, to be very fast, thoroughly seaworthy and is expected to do a large amount of business. This will give at least three lake routes to the river next summer.

There have been many marked improvements made in the Weather Bureau during its comparatively short existence; its methods are more scientific, its aims are broader, its results more satisfactory; and, in proportion to its progress, its need for intelligent observers is becoming more urgent. It is the wish of the chief of the Weather Bureau to some day strike the keynote to absolute accuracy in weather forecasting, and all his subordinates should indulge in the same hope and work for the same conclusion. To this end, no stone that could hide the precious secret should be left unturned, no experiment, however simple, and no theory be untested.

Amherstburg lake captains have been assigned to commands as follows: Capt. D. J. Girardin, the H. H. Brown; Capt. Duncan Nicholson, Tom Adams; J. T. Hutton, A. A. Parker; Don J. Duncanson, Ira H. Owen; John Burns, E. C. Pope; Joseph Powell, Fayette Brown; J. McLean, Wm. H. Stevens; Dan McCarthy, tug Sweepstakes; D. Stockwell, barge Energy; Eugene McCormick, steamer Imperial; Capt. Jacques Laframboise, steamship Wm. Edwards; Alex. Callum, E. M. Peck. Louis Allen will succeed Capt. Callum on the towbarge Geo. E. Hartnell. Theodore Young will be mate with Capt. Laframboise; Walker Norvell with Capt. McCallum; J. McGuire with Capt. Girardin, and T. Cooper on the Iroquois. L. Bellecourse will be second mate with Capt. Powell.

Capt. Alex. McDougall, of the American Steel Barge Co., returned from a business trip east yesterday morning. In the near future he will open a marine brokerage office in the board of trade building at the solicitation of a number of vessel owners that desire him to look after their interests at this end of the lakes. The venture will not be new for Capt. McDougall. He was in this business for many years before he became identified with the American Steel Barge Co. He will continue as general manager of the West Superior shipyards and will place his local marine office in charge of William A. Thompson, Jr., at present purchasing agent for the American Steel Barge Co. Mr. Thompson has been associated with Capt. McDougall for the past 12 years and is well known among the shipping interests of the Great Lakes.—The Duluth News Tribune.

RULES AND DIAGRAMS FOR DETERMINING THE BEARINGS OF COLORED LIGHTS—
SIDE-LIGHTS.

CHICAGO, ILL., March 21, 1899.

To the Editor of The Marine Record:

I have studied over the diagrams recently published in the MARINE RECORD, purporting to outline and show how any colored light can be proceeding, and this too by only giving one bearing when the light is first seen. I must confess that I do not understand the principle that you appear to be so certain about, in telling which way a vessel is steering from only seeing a colored light, and there are others whom I have talked with that are just as incredulous. If the rule works right it is a good thing, but there are many cases when we don't think that it will work right.

JAMES S. BURNS.

THE ERIE & WESTERN TRANSPORTATION COMPANY,
ANCHOR LINE, OFFICE OF THE WESTERN MANAGER,
BUFFALO, N. Y.

Editor Marine Record, Cleveland, O.:

Dear Sir:—Your communication to Mr. Frank J. Firth, Philadelphia, has been sent to me. I have consulted our experts with reference to the suggestion you refer to, and their opinion seems to be that it has very little technical value, and that masters and pilots would not be benefited by acting on the suggestions therein contained. Apparently our captains make it a practice to take observations substantially as outlined in your article; that is, that the natural custom among the pilots with reference to observations bring substantially the result which your article contemplates.

Yours truly,

E. T. EVANS, Western Manager.

STEAM-VESSEL INSPECTION SERVICE,
OFFICE OF LOCAL INSPECTORS,
OSWEGO, N. Y.

Editor Marine Record, Cleveland, O.:

Sir:—Yours of Jan. 31, directed to U. S. Local Inspector of Hulls, Oswego, N. Y., is at hand. In reply would say that, complying with your request, I have given the diagram you enclosed and their explanation some attention. Taking compass bearings is at all times good practice, and knowing how to do it with quickness and precision is useful in finding the distance of objects on the land from the vessel, and also the distance of such objects from each other, finding the exact place of the vessel, etc. I think all good pilots take the approximate bearing of crossing vessels in the night time if they have them in sight long; that is, they look at the compass to see if their vessel is on the course given the wheelsman, and then judge by the distance the approaching vessel is on either bow, how she bears.

I do not see that the arc of visibility makes any difference about taking bearings. At night a vessel's lights represent the vessel, and the colored lights designate which side of her you see. A change in the position of the vessel affects all the lights equally, except as regards their place fore and aft on the vessel. Careful pilots do not "split hairs" but when the "rules of the road" require them, keep out of the other vessel's way, they give him plenty of room and proper signals.

The range lights, that are required by law, show by opening out or closing in about how the approaching vessel is heading, and whether the vessel, required by law, to give way to avoid collision, should alter her course. If pilots are careful to note the change of position in these range lights, and always use the passing signals, as required by law, there will be very little danger of collision on the lakes when the weather is such that the bearings of a colored light can be taken.

Yours respectfully,

JOHN R. MOLTHER,
Inspector of Hulls.

TREASURY DEPARTMENT,
STEAMBOAT INSPECTION SERVICE,
OFFICE OF THE SUPERVISING INSPECTOR GENERAL,
WASHINGTON, D. C.

Editor Marine Record, Cleveland, O.:

Dear Sir:—I am in receipt of yours of the 31st ultimo, enclosing diagrams to determine by bearings between two vessels, the probabilities of the danger of collision or otherwise. My opinion of them is, that they would be a valuable help to every navigator if carefully studied, as they certainly should be, and they clearly illustrate the formula given for the same object by the late International Marine Conference, in their preliminary to the steering and sailing rules adopted by them as follows:

"Risk of collision can, when circumstances permit, be ascertained by carefully watching the compass bearing of an approaching vessel. If the vessel does not approximately change, such risk should be deemed to exist."

Very truly yours,

JAMES A. DUMONT,
Supervising Inspector-General.

JAMES DAVIDSON, SHIP BUILDER,
WEST BAY CITY, MICHIGAN.

Editor Marine Record, Cleveland, Ohio:

We received your favor of February 7th, enclosing sheet of side lights and their bearings. We forwarded your letter, together with this sheet to Capt. Davidson, who is now out of the city on a trip south. The captain writes that he thinks the suggestions given are admirable, and that they will prove of great value to the masters of ships. He thinks

that it would be a good thing if the masters could take the illustrations, and also thoroughly discuss same in their association rooms and meetings. They would then be able to look the matter up, discuss it thoroughly, and become personally acquainted with all the suggestions contained therein. After the matter is thoroughly mastered, he thinks that it will be a great benefit, not only to the masters themselves, but also to the interest of the vessel owners.

We therefore write you in regard to this matter, giving Capt. Davidson's opinion. Yours very truly,

JAMES DAVIDSON, Mgr.

STEAM-VESSEL INSPECTION SERVICE,
OFFICE OF SUPERVISING INSPECTOR, FIFTH DISTRICT,
DUBUQUE, IOWA.

Editor Marine Record, Cleveland, Ohio:

Sir:—your favor of the 31st ultimo came to my office during my absence from the city; that is why the delay occurred in answering it.

I am very favorably impressed with the diagram which you enclose, and think it would be very advantageous to lake navigation. The Board of Supervising Inspectors at their last meeting offered a resolution bearing a great deal on the same subject. Yours very respectfully,

WM. R. TIBBAK,
Supervising Inspector, Fifth District.

TREASURY DEPARTMENT,
BUREAU OF NAVIGATION, WASHINGTON, D. C.

Editor Marine Record, Cleveland, Ohio:

Your letter of the 1st inst., enclosing sheet of diagrams to appear in the MARINE RECORD, has been received.

The illustrations seem to be practicable, and will doubtless prove of general utility. Respectfully yours,

EUGENE T. CHAMBERLAIN, Commissioner.

INDEMNITY FOR GRAIN SHORTAGES.

The Great Lakes Guaranty Co., of Minnesota, having their main office at Duluth, take exception to a report recently printed in a Cleveland journal, and write it as follows, copy of which is desired to be published in the MARINE RECORD so as to positively and publicly offset any wrong impressions which a few readers might gather relative to the indemnity assurance on grain bills of lading as previously stated:

THE GREAT LAKES GUARANTY CO., OF MINNESOTA.
DULUTH, MINN., Mar. 16th, 1899.

To the Editor of the Marine Record:

A Buffalo correspondent in reporting certain phases of the meeting of the Lake Carriers' Bill of Lading Committee and other interests at Buffalo, has, inadvertently probably, outlined our proposition regarding the grain shortage question in a manner somewhat different than contemplated by its author.

It may interest your readers to know exactly what the proposition is:

First. We propose to organize a thorough system of inspection of weights, at all grain shipping and receiving ports on the chain of lakes.

Second. We propose to guarantee vessels against shortage in excess of one-quarter bushel to each 1,000 bushels carried.

Third. For our services and guarantee we propose to charge vessels on all grain excepting wheat 25 cts., and on wheat 30 cts. per 1,000 bushels from all ports to Buffalo, Erie, Fairport, and Toledo. From all ports to all ports not above specified, on all grain excepting wheat 30 cts., and on wheat 35 cts. per 1,000 bushels.

In offering this proposition for the consideration of the Bill of Lading Committee, it was simply with a view in case they failed to get a shortage liability clause inserted in the proposed new bill of lading, to recommend to the members of the association our proposition, as a substitute for such clause, and a remedy for the present inequalities in the turnout of grain cargoes.

We stated to the members of this committee that in order to succeed it would be necessary to have contracts with 80 per cent. of the grain tonnage on the Great Lakes, and as the time was short, an investigation by them would greatly facilitate matters.

In no way was it suggested at Buffalo, that the proposition was weak, as is mentioned by your correspondent, and on the contrary, each member of the bill of lading committee at Buffalo, speaking for himself, expressed a favorable opinion of our proposition, but the general opinion was that it would be inopportune to endorse our proposition, pending a settlement of the entire bill of lading controversy.

We have sufficient capital guaranteed to insure our ability to carry out our contracts, and unless it become positively apparent that vessel interests desired to continue the present method, we shall continue to work out the proposition.

Very respectfully,

CHARLES H. THORNTON,
H. G. ERHART.

RELATIVE to the action entered against the present company for using the firm name of the old established house of DeGraw, Aymar & Co., 34 and 35 South street, New York, we learn that the suit was, on March 10th, unanimously decided in favor of the old firm by the Appellate Division of the Supreme Court of New York, and from which it appears there is no appeal. The cordage firm of DeGraw, Aymar & Co. is one of the oldest and best, and all business interests will no doubt be pleased and satisfied at the rendering of the court.

THE MARINE RECORD.

THE CHICAGO DRAINAGE CANAL.

In all probability, before the end of the present year the great Chicago drainage canal will be completed. September 3, 1892, ground was first broken for a canal 35 miles in length, leading from the city of Chicago to Joliet, Ill. Should the great undertaking be finished by the 3d of September next, the work will have occupied a period of seven years. Under the law creating the Chicago Drainage District the canal must receive from Lake Michigan a volume of water equal to three hundred thousand cubic feet per minute, and this amount must be increased as the population of the city increases. At the rate which the city has been growing of late years it will not be long before five hundred thousand cubic feet per minute will be required to carry away the sewage of Chicago.

Many questions are suggested as this vast undertaking is nearing completion such as: What will be its effects on the lake levels? Will it be a valuable channel of commerce, or will it be nothing more than a sewage ditch to carry off the accumulated filth of a large city? How will it affect the fish industry of the Illinois River? Will it so contaminate the waters in the rivers below that they will be unfit for drinking and culinary purposes? These questions cannot be properly answered until the gates are thrown open and Lake Michigan sends a portion of its waters through the canal and the rivers down to the Gulf of Mexico.

To give a more perfect understanding of the canal, we publish the following synopsis of an address delivered some time ago at Marseilles, Ill., by Mr. E. J. Ward, the well-known civil engineer:

Waterways have ever been the people's highways, and their improvement has engaged the thought of mankind from earliest times. Men's civilization is measured by the commercial facilities which he enjoys.

Past efforts in canal construction, narrowed to the needs of certain localities, have been soon outgrown and cast aside. The new school of engineers has begun a study of North America, as a whole, and propose a gigantic system of internal and coastwise improvement, along which may throb the water-borne commerce of two hundred million people.

A casual glance reveals most striking topographical conditions. Mountain ranges, rich in mineral and forest wealth, parallel either coast, and between them a basin, capable of sustaining 20 times the population we have, slopes gently to the center of the continent. Connecting this interior plain with the ocean are three systems of waters. Hudson Bay on the north pierces it for 2,000 miles. Great fresh water seas, extending inland 2,300 miles, and having a water-shed of 260,000 square miles, temper the climate of the central steppe and invite commercial communication with the eastern ocean, while to the Gulf on the south sweep the waters of the mightiest river of all the earth, with its tributaries, like silver lace-work, shining through twelve hundred thousand square miles of verdure. This is the topographical panorama spread before us. It is of the best statesmanship to attune to the public welfare these natural advantages in order that mankind may enjoy to the greatest extent possible the fruits of his labor and thus rise to a still higher state of civilization.

A line drawn along the Atlantic Coast, another from New York City via the Hudson River and Great Lakes, to Chicago, a third from Chicago down the Illinois and Mississippi to the Gulf, and a fourth across the peninsula of Florida, form a circuit of trunk waterways which touches 50 per cent. of the total city population of the United States.

A secondary line can be advantageously constructed connecting Lake Erie with the Ohio near Pittsburgh; another across the same State via the Miami; a third joining Lakes Michigan and Erie across Northern Indiana and Ohio; a fourth across Wisconsin connecting Lake Michigan with the Mississippi; a fifth through the lakes and rivers of Ontario and Manitoba can connect Lake Superior with Hudson's Bay, and a sixth connecting Lake Huron with the St Lawrence River via the Ottawa River. Feeders of the third and fourth class can penetrate the country in many directions from these, the whole system reaching 78 per cent. of the city population of the United States.

It is proposed that whatever is hereafter expended on canals and rivers shall tend to the development of such a general system.

The trunk line of such a system should be of sufficient capacity to move with ease and rapidity the accumulation of ore, grain, lumber, coal and other products brought to it from the feeders.

While other routes may serve as useful feeders, there is but one pass through which a great trunk waterway, com-

mensurate with the needs of the future, can be built to connect the lakes with the Gulf of Mexico. Ages ago nature leveled the mountains of the North, and with their bones prepared this furrow for the welfare of man. From its summit, scarce 11 feet above the lake, to the Gulf there is a continuous descent. All other routes, connecting the lakes with the Mississippi, require the maintenance of a summit level higher than the lakes.

The first survey of the Chicago route was made in 1816, and the Congressional act of 1827 gave to the State of Illinois the "canal lands," which lie along our valley from the mouth of the Chicago river to LaSalle, on condition that the State construct and maintain in perpetuity a waterway connecting Lake Michigan with the Mississippi. The State accepted the lands, authorized canal construction in 1829 and began work on the Illinois and Michigan Canal in 1836. However, the canal was not completed until 1848.

At that time it was a wonderful achievement, and a commerce quickly sprang up which, to this day, has given to the counties bordering upon it over half the population and wealth of our State. The commissioners subdivided the canal lands at the mouth of the Chicago river, and the future metropolis of America was born.

It was the better facilities for transportation and communication to be had along the canal that attracted the early settlers and built up our cities. Every town from Joliet to LaSalle was located upon the canal—the railroad, following in 1854, was built through the way.

In those early days 120 tons net was a good train-load, and so long as the canal boat carried about one train load the boats competed successfully with the railway, but to-day the railways of the country have increased from one to two or more tracks, and train loads have doubled in net weight. The greater gross profit thus given to the road has had the effect of driving the boats from the canal. And yet the railway is one of our greatest blessings. It would be suicidal to return to the mule-drawn passenger packet of 50 years ago.

Promoters of modern waterways have no desire to injure railroad interests, and it is only the narrow-minded railway manager who does not see that the best interests of his road lie in increasing the population and wealth of the community.

The profitable use of the waterways through a well-settled country, in competition with the railway, depends largely upon the capacity of the channel and the ease and rapidity with which commerce can be hauled. The boat that navigates such a waterway should be capable of carrying not less than one train load.

The limit toward which the train load of the future will tend to reach is 1,000 tons net, and the boat should carry at least that load.

The locks of a servicable waterway should be as few in number as possible, and quickly and easily handled, and the water depth should be from 4 to 6 feet greater than the draft of boat.

The proposed waterway from Lake Michigan to the Mississippi river, via the Illinois, can be separated into four divisions:

1. From the lake, some six miles across the south side of the city of Chicago, to connect with the sanitary canal.
2. The sanitary canal, extending from the Chieago river to Lockport, 28.78 miles.
3. From Lockport to Utica, 61.5 miles.
4. From Utica, 230 miles, to the mouth of the Illinois river.

With the exception of a survey along 36th street nothing has yet been done toward determining the best route across the city of Chicago, but the canal when built should be broad, open and deep, sufficient to amply accommodate the demands of the future. Unless it is thus built, either by the Government, the States or the district, Chicago will soon lose its commercial prestige as a lake port, and the waterway from Lockport to the Mississippi will be robbed of half its value.

Six miles of towing along the already overcrowded Chicago river will seriously handicap any waterway beyond. There is no rock in the Chicago division. The principal expenses will be due to securing the right of way.

The second division—the sanitary canal—is now under way, and 71 per cent. of the excavation is completed. The contracts now let call for nearly \$19,000,000, and it will cost to complete this division about \$22,000,000. At Lockport will be located the works which are to control the flow of water and keep it constant, whether Lake Michigan is high or low.

Preliminary studies of the third division—from Lockport

to Utica, 61.5 miles—indicate the desirability of overcoming the total fall of 133 feet by five locks, the first near the Joliet Penitentiary, second about three miles below Joliet, third near the Morris Cemetery, fourth at the old Ottawa Dam, and the fifth at Starved Rock.

The estimates made are for locks having chambers 750 feet long by 90 feet wide in the clear, and with 16 feet of water on the miter-sills tows or fleet of barges carrying 10,000 tons, net, can be handled with ease. This is equivalent to 20 train loads, and on reaching New York City will fill one of the large ocean freighters. The foundations of the lock walls and the floors have been sunk deep enough so that, in the future, 21 feet of water can be had by excavating between the locks. Throughout the channel, where excavation is made in the bed of the Illinois, the bottom width is 300 feet, and the bottom width of canal around the rapids between Marseilles and Ottawa is 200 feet.

The division from Lockport to Utica can be constructed for about \$18,000,000, and the alluvial bottom of the Lower Illinois from Utica to the mouth can be dredged to a bottom width of 300 feet and water depth of 14 feet for about \$6,000,000.

Thus the entire channel from Lockport to the mouth of the Illinois can be made navigable on a scale commensurate with present needs and so designed that it will be capable of gradual development to the point of exhausting the economical possibilities of the future for about what it will cost the Sanitary District of Chicago to pierce the Chicago divide.

NOTICE TO MARINERS.

NORTHERN LAKES AND RIVERS—ELEVENTH DISTRICT.

The following affects the list of beacons and buoys, northern lakes and rivers, 1890:

MICHIGAN.—LAKE ST. CLAIR, Isle aux Peches Lights.—Since it has been decided to re-establish these lights on the reopening of navigation, the following descriptions should be entered on the List:

Isle aux Peches Range Beacon Light (front). Natural cluster of piles, with white day mark. Outer end Grosse-Point Club House dock, N. by E. $\frac{3}{4}$ E. Windmill Point light house, W. $\frac{5}{8}$ S. Two fixed white lens-lantern lights, 10 feet apart horizontally, in line across the axis of the channel, and 18 feet above lake level, on the prolongation of the axis of the dredged channel about 2,000 feet southwestly from its lower end. The northwesterly of the two lights illuminates 180° of the horizon to the northward of NE. by E. $\frac{1}{8}$ E. and SW. by W. $\frac{1}{8}$ W., so that in coming up the Detroit river on the Windmill Point Range line, this light may be run for as soon as it becomes visible. In passing vessels must keep to the westward of this light.

Isle aux Peches Range Beacon Light (rear). Natural cluster of piles, about 4,650 feet SW. $\frac{1}{4}$ W. in rear of front light. Two fixed white lens-lantern lights, 10 feet apart horizontally, in line across the axis of the channel, and 38 feet above lake level, on the prolongation of the axis of the dredged channel. The four lights of this range mark two range lines parallel with and 5 feet on either side of the axis of the dredged channel. When at the upper end of the channel, about abreast of Grosse-pointe light vessel, with the lights open so that the rear light of one range is in range diagonally across the axis of the channel with the front light of the other range, the observer would be about 40 feet from the axis of the channel and could safely increase the apparent horizontal distance between the lights about eight times without approaching too close to the line of buoys marking the edge of the channel. About midway between the light vessel and the lower end of the channel the apparent horizontal distance between the lights may be safely increased to sixteen times, and still further increased as the lights are approached.

By Order of the Light-House Board:

FRANCIS J. HIGGINSON,
Rear Admiral, U. S. Navy, Chairman.

THE PORT ARTHUR SHIP CANAL.

The 25th inst. has been set as the day for the formal opening of the Port Arthur ship canal, which is part of the harbor system of the gulf terminus of the Kansas City, Pittsburg & Gulf Railway, at Port Arthur, Texas. It is understood that arrangements for an elaborate celebration have been made and that a large delegation of foreign capitalists will be present, principally from Holland, where the securities of the road are held in large amount. This canal is $7\frac{1}{2}$ miles long, 183 feet wide and 25 feet deep, extending between Port Arthur and deep water. The excavation was done principally by hydraulic dredges and the work involved the handling of about 14,000,000 cubic yards of material.

APPOINTMENTS OF MASTERS AND ENGINEERS.

LEATHEM & SMITH TOWING AND WRECKING CO., Sturgeon Bay, Wis.—Steamer Jos. L. Hurd, master, John Walker; engineer, Geo. Keister. I. N. Foster, master, Chas. B. Packard; engineer, James Curry. Pewaukee, master, Sam Christerforsen; engineer, Mark Holt. Tugs, John Leathem, master, Henry Tufts; engineer, Ed. Webber. Sidney T. Smith, master, Peter Batchellor; engineer, Chas. Vandrasck. Geo. Nelson, master, John Tufts; engineer, Ashley Cofferin. Albert J. Wright, master, Thomas Isabell. Schooner Emerald, master, Andrew Olson. Evaline, master, John Campbell.

THE UNION TRANSIT CO., Buffalo, N. Y.—Steamer J. M. Nichol, master, Wm. McLean; engineer, Geo. Tretheway. Eber Ward, master, John L. McIntosh; engineer, John R. Judge. Avon, master, Norman McGuire; engineer, Jas. Countryman. Wm. H. Stevens, master, Alex. Clark; engineer, J. E. McSweeney. Portage, master, John Tyrney; engineer, Geo. W. Haig. Fisk, master, John Pearson.

THE CHICAGO FIRE DEPARTMENT, Chicago, Illinois.—Steamer Illinois, master, John F. Nolan; engineer, Daniel F. Rice. Geyser, master, Wm. H. Moore; engineer, Robert Nicholson. Yosemite, master, John W. Nolan; engineer, Chas. H. Waters. Fire Queen, master, Lewis A. Brockway; engineer, Wm. H. Kearney. Chicago (in reserve), engineer, Frank B. Hutchinson.

The following list of appointments of masters and engineers have been made by W. C. Richardson for the coming season of navigation: JACKSON TRANSIT CO., Cleveland, Ohio.—Steamer Samuel Mitchell, master, Thos. Wilford; engineer, James Falconer. Schooner Chickamauga, master, A. Phillips. RICHARDSON TRANSPORTATION CO., Cleveland, Ohio.—Steamer Roumania, master, Lewis W. Stone; engineer, Martin Burns. Schoonero John J. Barlum, master, John McKeigham. OWEN LINE, Cleveland, Ohio.—Steamers Parks Foster, master, E. J. Burke; engineer, A. C. Bowen. Ira H. Owen, master, D. J. Duncanson; engineer, Hugh Buchanan. W. C. RICHARDSON, Cleveland, O.—Steamers J. H. Wade, master, Richard Call; engineer, George McMonagle. Wm. Chisholm, master, Chas. R. Cleveland; engineer, Silas H. Hunter. J. H. Devereux, master, Jno. H. Babbitt; engineer, Thos. Shannon. J. H. Farwell, master, C. E. Sayre; engineer, John Johnson. Iroquois, master, Thos. Jones; engineer, E. W. Prince. VALENTINE FRIES, Milan, O.—Steamer William Edwards, master, Jas. LaFromboise; engineer, Moses Blodin. Schooner Golden Age, master, D. H. Stalker.

ARNOLD LINE, GEO. T. ARNOLD, MGR., Mackinaw Island, Mich.—Steamer Ossifrage, master, Wm. McCarty; engineer, Patrick Eustice. Minnie M., master, J. B. Mondor; engineer, Michael Madden. Islander, engineer, Wm. Porter. Edna, master, Chas. Mosier; engineer, D. Elliott.

R. O. & A. B. MCKAY, Hamilton, Ont.—Steamers Sir S. L. Tilley, master, W. O. Zealand; engineer, Joseph Boulanger. Lake Michigan, master, Arthur Lefebvre; engineer, Joseph Dawson. Myles, master, John S. Moore; engineer, Jas. Smeaton. Schooner T. R. Merritt, master, William A. Corson.

GURDON CORNING, Saginaw, Mich.—Steamer Oscoda, master, G. W. Ryan; engineer, Frank Nold. C. H. Green, master, C. E. Little; engineer, Wm. Ormsbay. Schooner Our Son, master, Peter Edgar. Genoa, master, D. C. Ryan. Ida Corning, master, Peter H. Edgar. C. G. King, master, Michael Ryan.

TOLEDO AND ANN ARBOR RAILROAD, Toledo, O.—Steam ferries, Ann Arbor No. 1, master, J. C. Ackerman; engineer, A. W. Ackerman. Ann Arbor No. 2, master, E. W. Clark; engineer, W. L. Campbell. Ann Arbor No. 3, Capt. J. M. Twichery; engineer, T. H. Cosgrove.

MACKINAC TRANSPORTATION CO., CAPT. L. R. BOYNTON, MGR., St. Ignace, Mich.—Steamer Sante Marie, master, L. R. Boynton; engineer, Richard Walsh. St. Ignace, engineer, H. T. O'Brien.

E. A. SHORES, Ashland, Wis.—Steamer J. H. Prentice, master, R. T. Evans; engineer, A. L. Roberts. Schooners Middlesex, master, Paul T. Weimer. Halsted, master, Edward Fitch.

ISLAND TRANSPORTATION CO., St. Ignace, Mich.—Steamer Algoma, master, G. W. Boynton; engineer, Jos. Rousseau. Wau-Kon, master, A. R. Graves; engineer, M. J. Fleming.

J. & T. COLON, Thorold, Ont.—Steamer Erin, master, P. Sullivan; engineer, J. Carr. Schooner F. D. Danforth, master, John Cornwall. Maggie, master, John Rosie.

JAS. W. MILLER, MGR., Detroit, Mich.—Steamer Iron King, master, Wm. H. Miller; engineer, Chris. Howard.

Iron Chief, master, W. A. Irvine; engineer, August Cobo. Iron Duke, master, N. L. Miner; engineer, Jno. M. Cronenweth. Iron Age, master, John McAlpine; engineer, John W. Deitsch. Schooner Iron Queen, master, Gus. E. Atkinson.

TIMOTHY DONOVAN, Oswego, N. Y.—Steamer John E. Hall, master, Timothy Donovan; engineer, John Donovan. Schooner John R. Noyes, master, M. B. Williams.

OHIO & PENNSYLVANIA TRANSPORTATION CO., Cleveland, O.—Steamer Alcona, master, W. T. Sutherland. Schooner Alta, master, John McNamara.

PARKER & MILLER, Detroit, Mich.—Steamer City of Toledo, master, Archie Fletcher; engineer, Edward Haycock. Greyhound, master, Bert S. Baker; engineer, Robt. Meddler. B. W. Blanchard, master, Thos. Merkleham; engineer, John Bloome. Favorite (wrecker), master, Martin Swain; engineer, G. L. Simmons. Saginaw (wrecker), master, Isaac Watt; engineer, L. Cronk.

A. A. PARKER, Detroit, Mich.—Steamer A. A. Parker, master, J. P. Hutton; engineer, M. J. Gilligan. John Oades, master, Tim Lemay; engineer, Harry Merrill. John Pridgeon, Jr., master, D. N. Sherwood; engineer, John Mogan. Schooner Red Wing master, Chas. Anderson. B. W. Parker, master, Edward Lohr. Saveland, master Henry Morey.

CHICAGO, SAUGATUCK & DOUGLAS TRANSPORTATION CO., Saugatuck, Mich.—Steamer Bon Ami, master, Wm. Turnbull; first engineer, Henry Randall; second engineer, Edward Lawn; clerk, Harry M. Bird. Saugatuck, master, John Campbell; first engineer, Wm. Bradley; second engineer, Al. Demming; clerk, J. F. Henry. Chas. McVea, master, C. B. Coates; engineer, Henry Bender.

THE GOODRICH TRANSPORTATION CO., Chicago, Ill.—Steamers Virginia, master, H. E. Stines; engineer, G. P. Roth. Columbus, master, Robert Smith; engineer, G. McLaughlin. Indiana, master, A. Gallagher; engineer, Ray Flint. City of Racine, master, J. Wilson; engineer, W. R. Patterson. Atlanta, master, D. Cochrane; engineer, W. J. Downing. Iowa, master, J. Raleigh; engineer, J. Buschmann. Georgia, master, E. Carus; engineer, A. J. Smith. Sheboygan, master, J. Munger; engineer, F. Neider. Chicago, master, C. Bronson; engineer, T. Dorey. Tug Arctic, master, C. Thayer; engineer, G. Germanson.

THE OLGA TRANS. CO., E. G. RIESTERER, MGR., Tonawanda, N. Y.—Steamer J. C. Pringle, master, T. R. Forton; engineer, J. N. Burns. Barge Sweetheart, master, C. F. Kellar; Benj. Harrison, master, C. C. Hanly; Unadilla, master, Fred Hepner.

VISIBLE SUPPLY OF GRAIN

As compiled for The Marine Record, by George F. Stone, Secretary Chicago Board of Trade.

CITIES WHERE STORED.	WHEAT. Bushels.	CORN. Bushels.	OATS. Bushels.	RYE. Bushels.	BARLEY. Bushels.
Buffalo	1,048,000	153,000	2,000	24,000	462,000
Chicago	4,477,000	12,010,000	1,481,000	450,000	870,000
Detroit	287,000	459,000	4,000	8,000	6,000
Duluth and Superior	9,435,000	5,341,000	2,071,000	290,000	461,000
Milwaukee	46,000	1,000	5,000	7,000	112,000
Montreal	20,000	16,000	413,000	3,000	6,000
Oswego	410,000	119,000	.....	.....	50,000
Toledo	56,000	914,000	105,000	3,000	.....
Grand Total	29,992,000	33,466,000	11,074,000	2,503,000	2,546,000
Corresponding Date, 1898	31,417,000	43,388,000	12,304,000	3,291,000	1,506,000
Increase	193,000	.....	461,000	.....	.....
Decrease	.....	567,000	.....	25,000	59,000

While the stock of grain at lake ports only is here given, the total shows the figures for the entire country except the Pacific Slope.

CONTRACTS GALORE.—A BUSY BUILDING PLANT.

Gas Engine & Power Co. and Charles L. Sebury & Co. (Consolidated), Morris Heights, New York City, builders of steel and wooden vessels, naphtha launches, and all classes of fancy tonnage, is at present one of the busiest firms in the United States. The company has always managed to secure and book orders well ahead, but the following list of work is ahead of and can not be duplicated by any other firm in the country.

Among the larger and more pretentious tonnage in model, equipment and speed, etc., we quote the following craft now under construction: The torpedo boat Bailey, 205 ft. over all, 6,000 H. P., with guaranteed speed of 30 knots per hour for two consecutive hours; the torpedo boat destroyer Stewart, 245 ft., with speed of 29 knots, and the torpedo boat Wilkes, 175 ft., with speed of 26½ knots. Steel steam yacht Kanawha, for Mr. John P. Duncan, 225 ft. in length over all,

twin screws, with guaranteed speed of 20 miles per hour, and anticipated speed of 22 miles. Steel steam yacht Aria, 145 ft. over all, with speed of 18 miles per hour. Composite steam yacht Mayita, 135 ft. over all, twin screw, with speed of 18 miles per hour. The Cayuga, 100 ft., twin screw, with speed of 13 miles, in all-wood construction. All of the large craft (excepting the torpedo boats and destroyer) will be fitted with the standard Seabury water tube boilers, and marine engines. The torpedo boats and destroyer will also have Seabury water tube boilers, but they will be of special design, approved by the Government.

Small craft ordered and building is: A 45 ft. cabin cruiser for Mr. H. P. Ogden, of Brooklyn. 43 ft. cabin cruiser for Rev. Alex. Mackay Smith, of Washington, D. C. 42 ft. speed launch for Mr. John Weber, Toledo, O. 35 ft. speed launch for Mr. Harry Miner, of New York. 32 ft. speed launch for B. Eldredge, Pres. of National Sewing Machine Co., New York and Belyidere, Ills. An 80 ft. twin screw naphtha cruising yacht for Mr. George M. Allen, New York. 21 ft. yacht tender for H. W. Sibley, Rochester, N. Y. 30 ft. cabin cruiser for Lorenzo Blackstone, Norwich, Conn. Five boats for Messrs. Tams & Lemoyne, of New York. 21 ft. launch for William K. Vanderbilt, Jr., New York. 25 ft. 4 H. P. tender for Arthur Curtiss James' new yacht. 18 ft. 2 H. P. tender for Dr. Eno's new yacht. 25 ft. tender for new yacht building for a Boston gentleman, and a 30 ft. 6 H. P. launch for Mr. Bowers, New York. 30 ft. cabin boat for David Terry, Rondout, N. Y. 25 ft. launch for A. N. Lothrop, Washington, D. C. 25 ft. launch for Owen Reilly, New York, and a boat of same size for Walter Bell, Fishkill, N. Y. 30 ft. cabin boat for Albert O. Bostwick, New York. 31 ft. yacht tender for Walter Kavanaugh, Montreal, Canada. 30 ft. cabin launch for Thos. M. McKee, Jeannette, Pa. 26 ft. gig for Messrs. John N. Robins & Co., Brooklyn, N. Y. 27 ft. speed launch for Mr. William Rockefeller, New York. Seven electric launches for the Electric Launch Company. Twenty-seven steam launches of 30 ft. length to be used as tenders on the Government army transports. Two launches, two gigs and other small boats for H. C. Wintringham, One tender for J. Roger Maxwell's new yacht, and one tender for Messrs. Pusey & Jones. New tender for Mrs. Carnegie's new yacht Dungeness. 30 ft. launch for Mr. C. L. Hill, of Scranton, Pa. 21 ft. launch for A. J. Marden, Exeter, N. H. 16 ft. launch for Washington E. Connor, New York, to be used in Florida. 33 ft. launch for the Jekyl Island Club, Brunswick, Ga., composed largely of New York gentlemen. 30 ft. cabin launch for Royal E. Deane, of Branham, Deane & Co., New York. 42 ft. cabin boat for the U. S. Government, to be used at Havana, and a 30 ft. launch for the Collector of Customs at Ponce, P. R. 18 ft. yacht tender for the steam yacht Aria building for Mr. Blake, of Bangor, Me. 25 ft. launch for Mr. E. G. Reynolds, Bombay, N. Y. 40 ft. cabin cruiser for Mr. Alfred Costello, N. Y. 25 ft. launch for Mr. Albert Landreth, Manitowoc, Wis., and a 30 ft. launch for Mr. Heyl, of Milwaukee.

A 57 ft. stern wheel steamer for Mr. Frank Williams, to be shipped to Principolka, C. A. 25 ft. speed launch for Henry Baldwin, New Orleans, La. 25 ft. launch for I. E. DeGowin, Cheboygan, Mich. New tender for the schooner Iroquois, formerly owned by Mr. H. C. Rouse, commander of the Seawanha-Corinthian Club. 45 ft. cabin launch with spar rig for Mr. M. L. Bear, Pensacola, Fla. 25 ft. launch for the Hon. M. S. Quay, Washington. 30 ft. speed launch for Daniel P. Duffie, West New Brighton, S. I.

A 30 ft. steam launch, 26 ft. naphtha launch, two 26 ft. life boats, 26 ft. gig, and cutter for the Neafie & Levy Co., to be carried on the new yacht building for Mr. P. A. B. Wiedener, Philadelphia. A 30 ft. 10 H. P. and 28 ft. 6 H. P. tender, also a 28 ft. gig for the steam yacht Aphrodite, built for Col. Payne, and recently launched at Bath. A 21 ft. naphtha launch, cutter and gig for the steam yacht Mayita building for Mr. Louis Bossert, of Brooklyn. 21 ft. yacht tender for Mr. H. M. Johnson, New Orleans, La.

A 36 ft. 10 H. P. launch for the Repauno Chemical Co. New York. 30 ft. launch for the Cape Fear Towing & Transportation Co., at Southport, N. C. 25 ft. launch for Mr. H. B. Schuler, Chicago.

A 30 ft. steam launch, 25 ft. naphtha launch, gig and cutter for the new yacht building for Mr. John P. Duncan, of New York.

In addition to the foregoing lengthy, and we trust lucrative list of orders, the firm have built up a stock of about sixty naphtha launches in an assortment of sizes to meet the spring trade, which is invariably a brisk time at the Morris Heights plant.

CAPITAL INVESTED.

There are invested in railroads, ships, mines, docks, etc., exclusively for the iron ore mining and carrying trade of the Lake Superior country, the following totals:

Capital in mines, five districts	\$75,000,000
Capital in docks	16,500,000
Capital in iron ore roads	35,000,000
Capital in ships	43,000,000
Capital in receiving docks	18,000,000
Capital employed in carrying inland to mills from Lake Erie	40,000,000
Total	\$228,500,000

These investments are increasing year by year, last season the outlay amounted to \$4,500,000.



ESTABLISHED 1878.

Published Every Thursday by
THE MARINE RECORD PUBLISHING CO.,
Incorporated.

C. E. RUSKIN, - - - Manager.
CAPT. JOHN SWAINSON, - - - Editor.
THOS. WILLIAMS, Chicago, - - Associate.
CLEVELAND, - - - Royal Insurance Building.
CHICAGO. - - -

SUBSCRIPTION.

One Copy, one year, postage paid,	\$2.00
One Copy, one year, to foreign countries,	\$3.00
Invariably in advance.	

ADVERTISING

Rates given on application.

All communications should be addressed to the Cleveland office.
THE MARINE RECORD PUBLISHING CO.,
Western Reserve Building, Cleveland, O.

Entered at Cleveland Postoffice as second-class mail matter.

CLEVELAND, O., MARCH 23, 1899.

We have just received the December monthly weather review containing November data. We would say that it might perhaps be better to keep such a review on file in the office and not let it see the light of day unless there was something printed in it that might be asked for several months after it is printed. There seems to us no reason why this publication could not be got out at a more seasonable date.

THOUGH a definite forecast of the date of the opening of navigation cannot, of course, be made, opinion along the several river fronts has it that vessels will have begun a pretty general movement by April 15 all over the lower lakes. Dispatches state that the only obstructions immediately north of Detroit is at the head of the St. Clair river, opposite Fort Gratiot, where a rather formidable jam still exists. There is also plenty of ice in Lake Erie and at the lower end it is still thick. But Buffalo harbor is free. Chicago reports that the fringe of ice along the shore shows encouraging signs of breaking up. Ice at Mackinac Straits is very thick, as it is all through the St. Mary river. Duluth harbor ice is also still thick and stubborn.

THE production of Bessemer steel in Great Britain in 1898 amounted to 1,759,386 tons of ingots, against 1,884,155 tons in 1897—a falling off of 124,769 tons. The decrease is plainly due to the success of American rail makers in increasing their export trade, and to a corresponding falling off in the export shipment of British Bessemer rails. Against the record above is to be set the advance in Bessemer steel production in the United States from 5,475,315 gross tons in 1897 to 6,609,017 tons in 1898. The British Iron Trade Association has also collected recently the statistics of open-hearth steel production, showing 2,806,600 tons in 1898—a gain of 204,794 tons over the preceding year. Of the total, 2,590,512 tons was acid and only 216,088 tons, basic. In the United States the preponderance is reversed.

A NOTABLE compliment has been paid to Chief Constructor Hichborn by the greatest technical society that has to do with naval shipbuilding—namely, the Institution of Naval Architects. Admiral Hichborn received a cablegram from Professor Bliss, at London, announcing that the Institution had elected him to honorary membership, a life connection of great dignity in naval circles. Professor Bliss is the designer of the American line steamers Paris and New York, and himself enjoys an enviable professional reputation. Chief Constructor Hichborn has for thirty years been an active member of the institution, and he is professionally well known to the British and other foreign architects through the leading part played by him in the construction of the new American navy.

U. S. LIGHT-HOUSE SERVICE.

The annual report of the United States Light-House Board, which has just come from press, contains an interesting compilation of statistics affording further proof of the fact that no country can compare with the United States in the liberality of its aids to navigation. At the close of the year there were under the control of the Light-House Establishment the following named aids to navigation: Light-house beacon lights, 1,179; light-vessels in position, 44; light-vessels for relief, 6; electric-lighted buoys in position, 11; gas-lighted buoys in position, 55; fog signals operated by steam, caloric, or oil engines, 158; fog signals operated by clockwork, 209; post lights, 1739; day or unlighted beacons, 439; whistling buoys in position, 70; bell buoys in position, 116; other buoys in position, including pile buoys and stakes in fifth district and buoys in Alaskan waters, 4,707.

In the construction, care, and maintenance of these aids to navigation there were employed: Steam tenders, 31; steam launches, 11; sailing tenders, 2; light keepers, 1,339; other employes, including crews of light-ships and tenders, 1,226; laborers in charge of post lights, 1,356.

An idea of the cost of maintenance of this service may be gained from the following statement of appropriations for a single year, which has no reference to the regular heavy annual expenditures for extinctions and improvements, and which does not include the salaries of army and navy officers in charge of the service: Supplies for light-houses, \$425,000; repairs for light-houses, \$600,000; salaries of light keepers, \$720,000; expenses of light-vessels, \$350,000; expenses of buoyage, \$550,000; expenses of fog signals, \$110,000; lighting of rivers, \$300,000; surveys of light-house sites, \$1,000; oil houses for light-stations, \$5,000.

GRAIN AT THE HEAD OF THE LAKES.

The elevators at Superior and Duluth contain about as much grain as it is possible to get into them. Last week a heavy business was done in receiving grain. Ending Saturday night, 806,610 bushels of wheat had been received and 19,591 bushels shipped. Corn receipts were 328,001 bushels in six days, shipments amounting to 1,726 bushels. Oats received were 48,853 bushels; rye, 13,977; barley, 10,713; flax, 17,281. Flax shipments amounted to 14,722 bushels. Beginning with this week the amount of wheat in store is 9,453,036 bushels, not counting 267,808 bushels afloat in the harbor. This shows an increase for the week of 745,083 bushels. Corn in store amounts to 5,341,381 bushels, an increase of 326,275 bushels. Other grains in store are: Oats, 2,071,132 bushels showing an increase of 48,853 bushels; rye, 289,806; increase, 13,977; barley, 460,742; increase, 10,713; flax, 1,104,338; increase, 2,559 bushels.

THE BAROGRAPH ON LAKE VESSELS.

Mr. H. W. Richardson, local forecast official, Weather Bureau, of Duluth, Minn., published in the Evening Herald of January 3, 1899, an interesting account of the efforts made by the Weather Bureau to increase the safety of navigators by introducing the barograph into daily use. He says the first barograph used on the Lakes was placed by the Weather Bureau in 1892 on the steamer John V. Moran. The record sheet gives practically the record of the ship's course, with the air pressure, the wind, and the state of the weather during her whole trip. The prime object of placing the barographs in the hands of navigators was to educate them in the practical use of the barometer in connection with the daily weather map.

During the past season navigators and pilots on the Great Lakes who have used these instruments say that they have received great benefit from watching the action of the barometer.

Of the forty navigators who used the barograph during the past season, only three have said that its use was not of sufficient importance to them to be further desired.

In this connection it is needless for the RECORD to say that the three are ignorant dummies, notwithstanding the fact that a prominent Cleveland vessel owner has told us exactly the same thing.

FALLING METEORS.

The United States Monthly Weather Review for December last, published by the Department of Agriculture Weather Bureau, and just issued states that the occurrence of the November shower of meteors seem to have tempted active newspaper correspondents to add their own unnecessary exaggerations to the great stories reported by the ship captains. Thus, Capt. Gartel, of the bark Quevilly, which arrived at Philadelphia November 25, and sailed

away a few days later, stated that on November 15 a huge meteor flashed out of the heavens and fell with a tremendous splash directly in the path of the vessel. The numerous other details published in the Philadelphia papers are generally considered to be the invention of the newspaper reporter. We should probably discredit the whole story had we not a similar report from Capt. H. C. McCallum, master of the barge Masaba, of the Minnesota Steamship Co., Cleveland, O. Over his own signature he writes from Two Harbors, Minn., to the Weather Bureau, as follows:

I, with my second mate, wheelsman, and lookout, saw a meteor fall from the heavens Monday, about 11 o'clock p.m., November 14. We were about 20 miles east of Standard Rock, steering west, and this meteor was due west, or dead ahead when it fell. It was blowing a gale from the west-southwest at the time. It gave me quite a start and also a scare at the time; never saw anything like it before, and for my part never want to see one again. It was about the size of an oil barrel and lit up the heavens, it being white with colors on the edges.

Capt. Morgan, of the Marina, saw it; he was abreast of Copper Harbor, Mich., and it fell in the direction of Houghton, Mich., at about 11 o'clock, so it must have fallen somewhere in that vicinity, as we were 50 or 60 miles due east of Houghton and on a line with the fall of the meteor.

As there is nothing at all impossible in the fall of a meteor into the ocean or the Great Lakes, we may probably give credence to the two reports above quoted.

LAKE FREIGHTS.

Lake freights on coal to Lake Michigan ports has been fixed at 30 cents. It is claimed that charters for Chicago and Milwaukee were made at that figure last week and were not reported. The steamers chartered will load for Chicago. The charters reported fix the opening rate and the vessels that were chartered and loaded during the winter will have to accept that figure. No wild or actual trip chartering for the head of Lake Superior has been done. The situation in regard to season charters is unchanged. Both sides are in shape to do business but the shippers are not ready to pay the rates demanded by vessel owners.

Nothing is being done in ore freights and shippers have about given up trying to get tonnage at the old rates. A Detroit vesselman, who was in Cleveland, told a story about a large ore shipper who went from Cleveland to Duluth and from that port to Hot Springs for some tonnage which he was able to line up. Duluth grain shippers are still bidding for tonnage to arrive and the rate is firm at 2½ cents. A Cleveland manager said yesterday that he was holding his boats for 3 cents, and that he was satisfied that the rate would go to that figure during the next week or ten days.

The indications are that vesselmen who tied up for ore will take very little season coal, as they are in somewhat of a hurry to have their contract ore as soon as possible to carry grain or take advantage of any improvement in down freights that may take place.

On the whole the chartering of boats is not in the hands of the consignees as formerly. The owners have something to say relative to the disposal of their vessel property and there is no sense in losing money every season, as they are now beginning to perceive.

The coal freight market is getting stronger if anything, vesselmen and shippers are getting farther apart on rates. At the start vesselmen were satisfied with 40 cents to Portage for the season, but it is said that all the boats that were on the market at that figure have withdrawn, and a stand for 50 cents will be made. Shippers say that the vesselmen are asking too much and that no contracts will be made if they hold out for the high rates that are being talked. The committee appointed by the Lake Carriers' Association last week to formulate a coal bill of lading has done nothing as yet. The vesselmen want a form that will be fair to both sides, and the leading shippers say that they will not oppose a bill of lading similar to the one in use in the ore trade. Vesselmen say that the matter should be settled before the shipping season opens.

WE announce that the contract for building the foundation of the new 3,000,000-bushel steel grain elevator at Superior has been let. Its location will be on the site of No. 1 coal dock, now occupied by the Northwestern Fuel Co. The elevator will be modeled after those in Buffalo, but 500,000 bushels larger. The excavation for the foundation will require the removal of 70,000 cubic yards of material and the driving of 30,000 piles.

SHIPBUILDING.

The Union Iron Works has just been awarded the contract for two of the largest freight steamers ever built in the United States. The vessels are for the American Hawaiian Steam Navigation Company, with headquarters at New York, in which Dearborn & Co. and Filbert & Co. are interested. The company is to ply its craft between New York, Philadelphia, San Francisco and Honolulu, with the probability of extending the route. The first steamer is to be turned out in April, 1900, and the second one at a later date. Each will have a carrying capacity of 8,500 tons. The first vessel will be 410 feet long with 51 feet beam and a depth of 32 feet. Her engines are to develop 2,500 horse-power.

The Polson Iron Works, Toronto, Ont., are building a 14-knot propeller, 100 x 21 x 7, for the Ottawa River Navigation Co., to carry 300 passengers; a 15-knot steel passenger steamer, 112 x 22½ x 6, to be named Majestic, for the Richelieu River Navigation Co., and a composite steam cutter, 36 x 9 x 3, for G. Gooderham, Toronto, as tender for his yacht.

The Burlee Dry Dock company, Newport News, Va., has just accepted contracts for a large sea-going tug, to be built of steel. Other contracts are three steel barges, a 12,000 horse-power marine engine, and a number of harbor barges and boats. The plant is so crowded with work, that several boats were sent to the McWilliam dry dock.

Hall Bros., Port Blakely, Washington, have laid the keels for two 4-masted schooners, each to carry about 900,000 feet lumber and be ready to launch by July 1.

A company has been organized at Seaford, Del., with \$20,000 capital to establish a new marine railway there and go into vessel building also.

The two revenue cutters to be built under appropriations by the last Congress are to be for the Great Lakes. Each \$165,000 and for the Pacific Coast \$225,000.

A steam yacht 100 feet long, 18 feet beam and 5½ feet draft, with ten knots speed, is to be built by F. W. Ofeldt & Sons, 25th street, South Brooklyn, for Wm. Gillette, dramatic author.

The New England Shipbuilding Co., Bath, Me., has contracted to build a 5-masted schooner for Fall River parties.

The R. M. Spedden Co., of Baltimore, Md., has received a contract from the Government for the construction of a steel despatch boat for use in the Patapsco river. She will be built for the use of the Quartermaster's Department of the United States Army stationed at Fort McHenry, as a supply and dispatch boat between Fort McHenry and the new batteries at North and Pawkins Points. She will be 90 ft. in length, 18 ft. breadth of beam, and 10 ft. depth of hold. She will be driven by a compound engine, with cylinders 12 and 24 in. in diameter. There will be a dining and galley saloon forward and two staterooms aft. A large room will be placed aft the wheel-house on the roof of the deck-house.

Government shipbuilding was practically inaugurated in Richmond on March 11, by the laying of the keel of the torpedo boat Shubrick, at the recently established plant of the W. R. Trigg Shipbuilding Co. This boat is one of three of a similar design, the others being the Thornton and Stockton. These and two torpedo boat destroyers, the Dale and Decatur, will all be constructed together, the preliminary work for all of them being well under way.

James Davidson, W. Bay City, Mich., will soon begin to build a 120-foot tug boat for Port Huron owners.

The Jenks Shipbuilding Co., which has established a steel shipbuilding plant at Port Huron, will build a steel freight steamer 240 feet long, 43 feet beam and 27 feet depth.

R. C. Brittain, Saugatuck, Mich., has launched a new root-foot steamer for service between Saugatuck and Milwaukee, in the fruit trade.

The New England Ship Building Co., of Bath, Me., has just closed a contract to build a large five-masted schooner for Capt. Chase and others, of Fall River, Mass. There are two other five-masters building at Bath, one at the yard of Percy & Small and the other at Gardiner G. Deering's. The former will be launched in May. Work on the new vessel will begin as soon as the material arrives. The New England Ship Building Co. already have coal barges for the Consolidated Coal Co., of Baltimore, under construction at their yards.

James & Tarr, of Essex, will build for Fred L. Davis, of Gloucester, Mass., a new schooner of 108 tons. She will be launched about June 1, and will be engaged in the Bank cod-fishery under command of Capt. John McDonald, now of the schooner Gladstone.

The organization has been effected in Portland, Me., of a new steamship company. It seems to be composed of the

leading members of the other steamship companies of the city, the Maine, the Portland and International, and the filing of the certificate of incorporation caused some curiosity among those who knew about the matter. Hon. Charles F. Libby, when interrogated about the matter, said that it had not taken definite shape as yet, and was really not a matter of importance. The new company is known as the Portland Consolidated Steamship Company. The articles of incorporation show that the company is to carry freight and passengers upon the high seas, and from port to port in this and other states, to purchase and acquire steamboat property, and is authorized to issue \$500,000 worth of stock; nothing, however, has as yet been paid in. The directors are John Englis of New York City, Joseph S. Ricker of Portland, J. S. Winslow of Portland, Charles F. Libby of Portland, Charles M. Englis of New York City, Horatio Hall of New York City, Leander W. Fobes of Portland and John F. Liscomb of Portland. The clerk is John F. Liscomb, the president is John Englis and the treasurer is John F. Liscomb. It is shrewdly guessed that the new company will proceed with the building of the new steamer, which it is proposed to name the Governor Dingley, and that when the legal questions arising from the loss of the Portland are settled, the new organization will merge into the Portland Steamship Company again.

Paul Le Roux, the shipbuilder at Albany, N. Y., has secured the contract for building the new passenger steamer for the Albany and Castleton line. The steamer will be 120 feet long and 25 feet beam. She will have two decks, a ladies' cabin, a freight cabin, and will be run by a 4½ compound engine. The steamer will cost in the neighborhood of \$32,000 and will be the first passenger steamer constructed at Albany in 20 years. The machinery will be constructed by Nicholson, of Albany. Work on the new boat will be commenced next week, and it is expected that she will be completed early in July. The Albany and Castleton line will then have three boats, the Black, the Evans and the new steamer. The New Baltimore and Albany line has disbanded, and the Lotta and Elaine are now running in southern waters. The Black and the new boat will take the place of these two boats. Mr. Le Roux will increase his force of men next week and work on the steamer will be rushed.

Samuel Ayres & Sons, of Nyack, N. Y., has received a contract for the construction of a fine sloop yacht for Malcolm Graham, a well-known business man of New York City. The yacht will be 46 feet over all and 14 feet beam, and will be finished in the best style. The yacht will be used for cruising by Mr. Graham. Ayres & Son are also about finishing the work on a handsome cruiser for the Rev. Thomas Dixon, of Brooklyn. The boat will have a naphtha engine. The work on the handsome little cruising yacht will soon be completed.

ICE IN RIVERS AND HARBORS.

As to the condition of ice in rivers and the Great Lakes, with reference to resumption of navigation, the following special reports are received from Weather Bureau officials:

Albany, N. Y., March 21.—Floating ice in Hudson; gorge at Stockport moved out 16th; navigation to Castleton opened 18th. Ice in Mohawk has not moved far; is cracked and badly rotted.

Buffalo, N. Y., March 18.—Ice fields have been much loosened during the week and moved up and down the Lake according to direction and force of wind. Ice has become much discolored, and some large fields have moved down Niagara River; still visible as far as the eye can reach from about two miles above outer lighthouse. Fire tug, out on lake on 16th, reported ice about 7 to 8 inches thick.

Cleveland, Ohio, March 18.—While ice has diminished materially during week, extensive fields still appear with onshore winds. Harbors along south shore are generally open, and a passenger steamer is announced to start from Detroit for Cleveland on the 22d, which indicates that local navigation will be resumed here about the same time as last season. General navigation is not expected before April 10, nine days later than last season.

Detroit, Mich., March 18.—Detroit river free from Lake St. Clair to Lake Erie; ice packed solid from mouth of river to Point Pelee; in Lake St. Clair ice packed solid in the flats, with loose ice floating in lake; steamer will endeavor to cut passage through flats on 19th. The Detroit and Cleveland line will start steamer for Cleveland before March 23.

Port Huron, March 18.—The conditions have changed but little during past week. Off Tawas Point, where at this time last year there was practically no ice, lake is closed as

far as the eye can reach. Vesselmen at Bay City do not expect resumption of navigation on Lake Huron before April 20. No open water in sight at Sand Beach. Ice jam in St. Clair river now located near head of Lake St. Clair.

Chicago, Ill., March 18.—There is no ice visible over the southern end of Lake Michigan, and vessel masters report that there is almost no ice on the west shore of Lake Michigan between Chicago and Sheboygan, but that there is some between Sheboygan and Manitowoc. Boats will begin to run from Chicago to Grand Haven about April 1. General navigation will not open until the Straits of Mackinac are clear, which will probably be about April 20. The displayman at Mackinac reports: "Heavy winter weather, with sleet and snow increasing thickness and strength of ice; prospects of opening very late."

Grand Haven, Mich., March 18.—The harbor remains clear of ice, but an ice field about five miles in width and composed of very large cakes of great hardness is reported to extend nearly parallel with the shore about 15 miles out, offering some obstruction to navigation.

Sault Ste. Marie, Mich., March 18.—The week has been unusually cold and the ice continued to increase in thickness. It will require the most favorable weather from now on to enable boats to get through Straits by April 20.

Marquette, Mich., March 18.—The ice field is now a solid white sheet and extends in all directions as far as can be seen. There has been no movement of ice during week; it has increased about two inches in thickness. All ice will readily break up and move out with a high southerly wind. Some local vesselmen predict navigation will open about April 20.

Escanaba, Mich., March 20.—Navigation will probably not open before April 15.

Milwaukee, Wis., March 18.—The river and harbor of this port now free from ice and boats running regularly. Vesselmen report some floating fragments along the shore to north, but not enough to interfere with navigation. Preparations being made for resumption of navigation about April 15.

Duluth, Minn., March 18.—Harbor ice varies from 8 to 38 inches thick; average 30 inches. It is reported that outside ice extends along north shore nearly to Grand Maris; thence as far out as visiou reaches; thickness, 8 to 18 inches. The outlook appears to continue favorable for reopening of general navigation between lower lakes and this port from May 1 to 10, about fifteen to twenty days later than last season.

THE CRAIG SHIP BUILDING CO. CONTRACT FOR A STEEL STEAMER, WORK AT THE TOLEDO SHIPYARD.

The Craig Ship Building Co. announce that another keel will be laid at the Toledo yard of that company immediately after the launch of the steel steamer for the Porto Rico Steamship Co. (Miller, Bull & Knowlton) of New York, now nearing completion. Material for this second steamer was provided for some time ago. She will be built with a view to transfer to the Atlantic seaboard. The Miller, Bull & Knowlton steamer will be a very powerful vessel in proportion to dimension. She is to be 220 by 32 by 13 feet, and will have triple-expansion engines of 22, 37 and 61 inches diameter, with a common stroke of thirty-six inches, steam being supplied at 175 pounds pressure, from two cylindrical boilers, 12 feet in diameter and 11½ feet long. To be placed in the general cargo trade. The wooden steamer Preston is being lengthened forty-eight feet, and it is expected that this will give her a capacity of a million feet of dry pine on a draught of twelve feet. Other improvements include steel arches, as well as steel keelsons, and steel plates under the rail from house to house on both sides; also new stacks and boiler breeching, with new boiler house. The Gettysburg is also receiving a general overhauling and extensive repairs, including steel arches, etc.

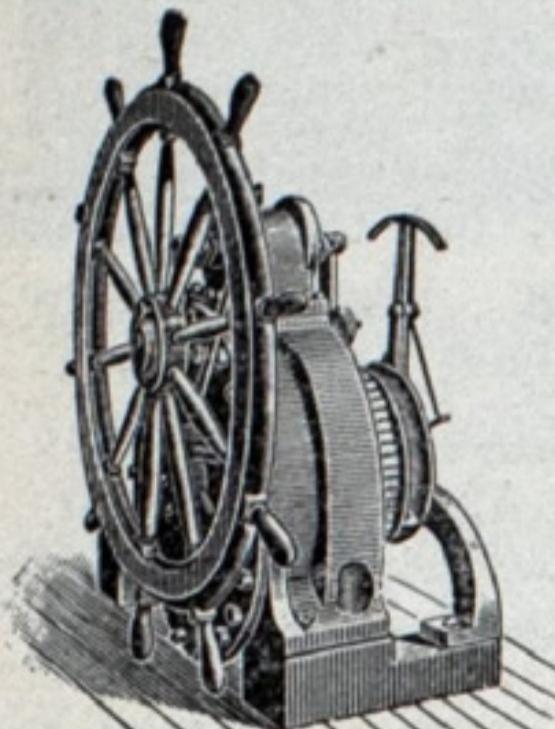
APPOINTMENTS OF MASTERS AND ENGINEERS.

THE MERCHANTS LINE, Montreal, Can.—Steamer Cuba, master, Hy Chestnut; engineer, Wm. Kennedy. Melbourne, master, Fred Elliott; engineer, Thos. Milne.

THE CANADA ATLANTIC TRANSIT CO.—Steamer Briton, master, Jas. B. Watts; engineer, W. R. Donaldson. German, master, D. Carrier; engineer, J. H. Gilbo. Grecian, master, Wm. Baxter; engineer, Thos. Kelly. Saxon, master, Alex Birnie; engineer, Geo. E. Averill. Roman, master, A. J. Greenlay; engineer, S. A. Wells.

(See page 9).

Queen City Patent Hydraulic Steerer.



The best and most reliable
Generates no heat in pilot house.
Has large hand wheel.
Can be changed from power to hand steering instantly.
A favorite with pilots.

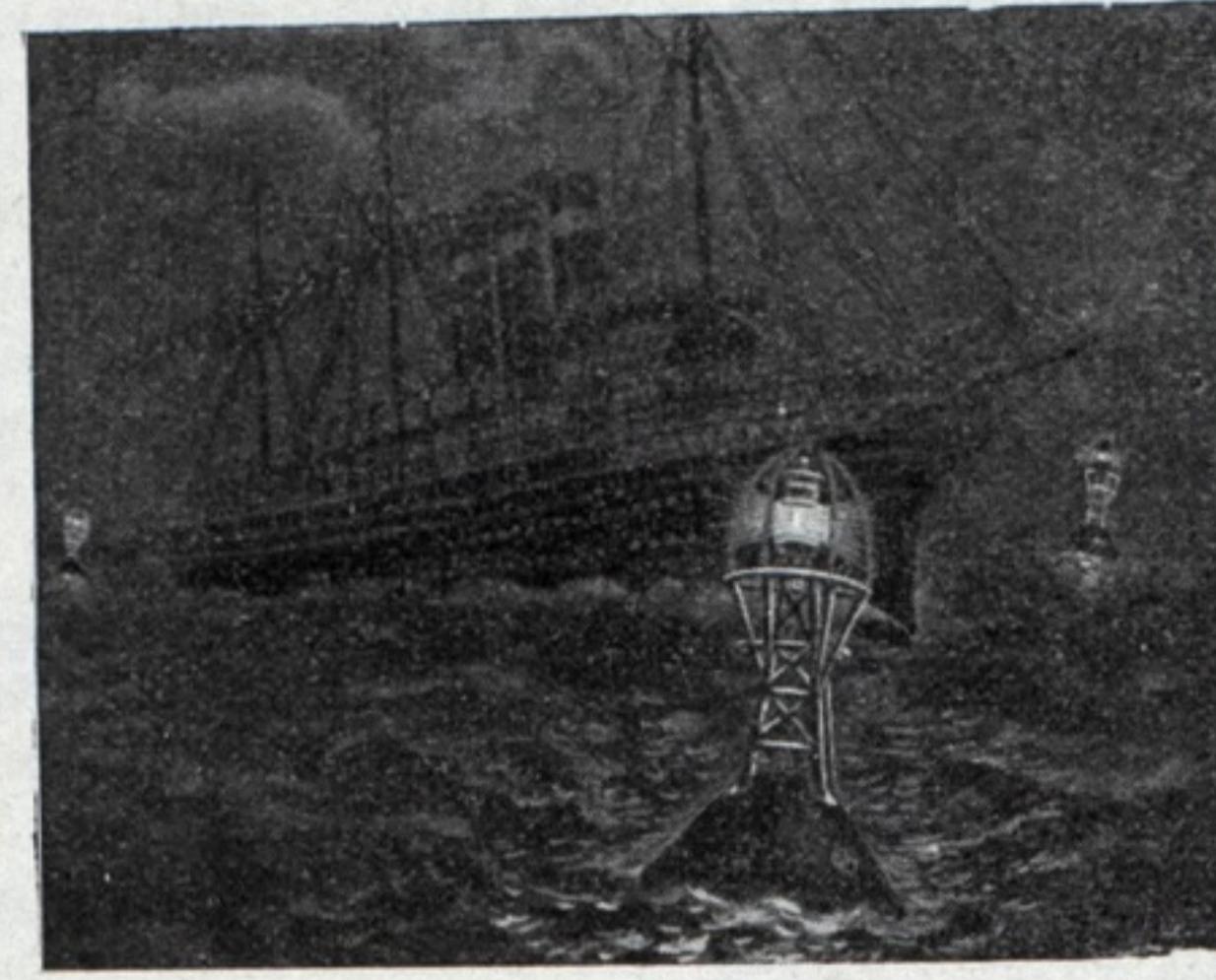
Send for References.

Queen City Engineering Co.

BUFFALO, N. Y.

Pintsch Gas Lighted Buoys.

Adopted by the English, German, French, Russian, Italian, and United States Light-House Departments for channel and harbor lighting. Over 800 gas buoys and gas beacons in service.



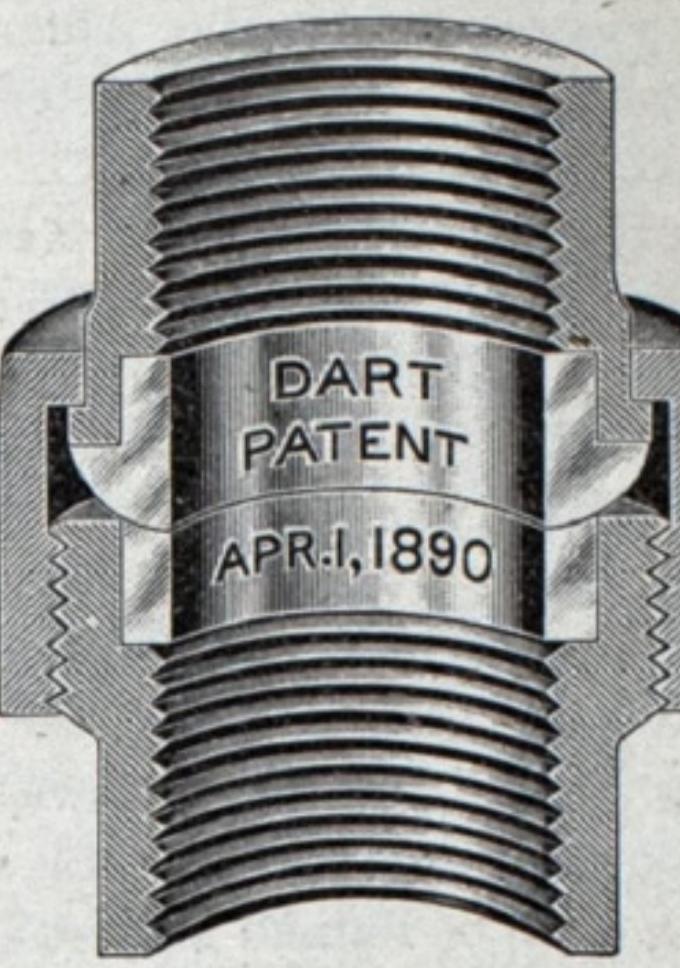
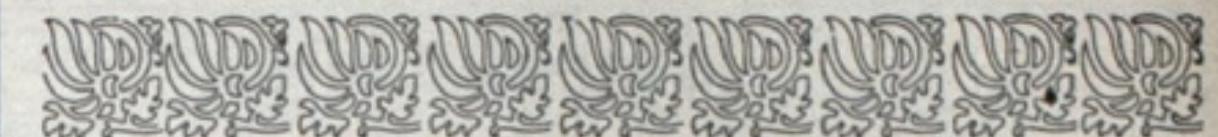
Burn Continuously

from 80 to 365 days and nights without attention, and can be seen a distance of six miles.

Controlled by

THE SAFETY CAR HEATING
AND LIGHTING CO.

160 Broadway, New York City.



The
Best
Union

Made in the U. S.

Mnfd by the

E. M. Dart
Mfg. Co.

Providence R. I.
Send for circulars and prices.

Almy's Patent Sectional WATER TUBE BOILERS.

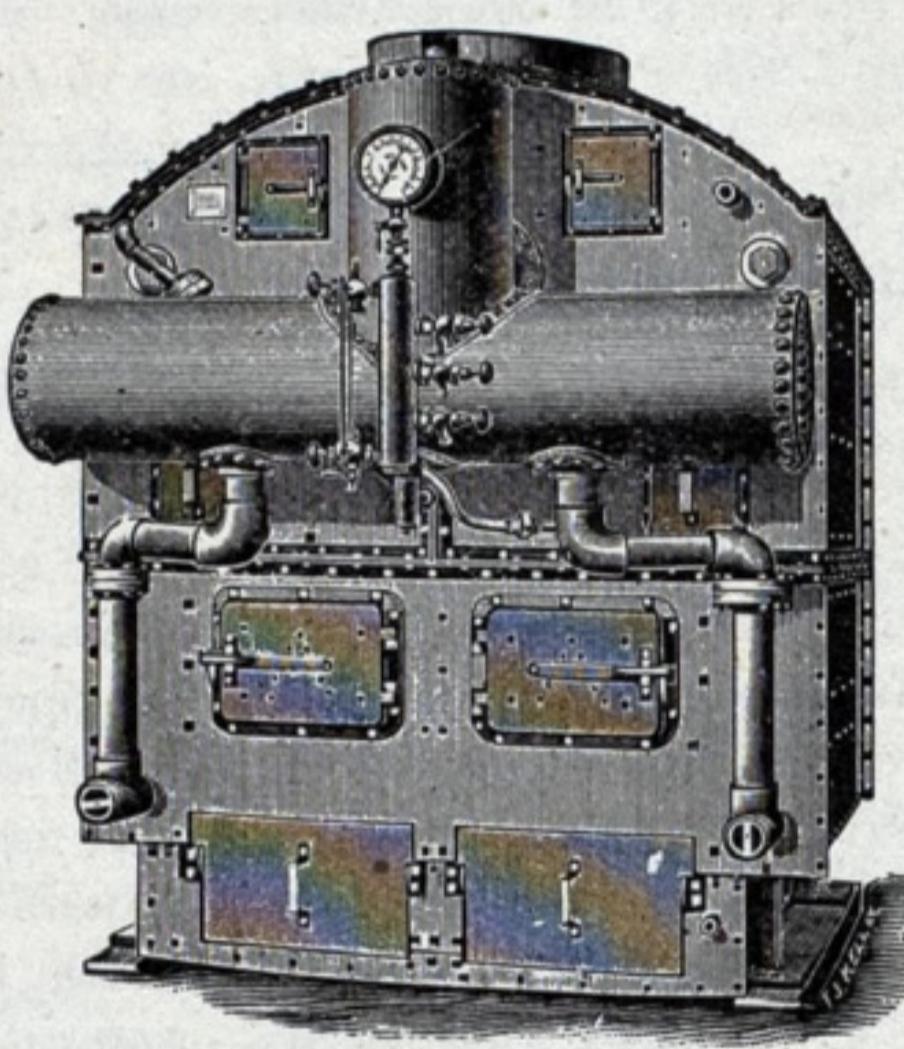
NOW USED IN

21 Passenger Boats from 70 to 160 ft. long.
61 Steam Yachts from 50 to 180 ft. long.

U. S. TORPEDO BOAT "STILETTO."

Numerous freight and fishing steamers, launches and stationary boilers are giving most excellent results.

ALMY WATER TUBE BOILER CO.,
178-184 Allens Ave., near Rhodes St., PROVIDENCE, R. I.



SHIPPING AND MARINE JUDICIAL DECISIONS.

(Collaborated specially for THE MARINE RECORD.)

A Tow Not a Carrier.—A steamboat owner engaged in the business of towing is not a common carrier. Knapp, Stout & Co. Company vs. McCaffrey, 52 N. E. Rep. (Ill.) 898.

Lien for Towage.—One towing a raft of lumber for another has a common-law bailee's lien on the lumber for his services while it is in his possession. Knapp, Stout & Co. Company vs. McCaffrey, 52 N. E. Rep. (Ill.) 898.

Defeat of Lien—Delay.—One towing rafts or lumber for another does not defeat his lien on one raft by delaying to enforce his lien for towing the others. Knapp, Stout & Co. Company vs. McCaffrey, 52 N. E. Rep. (Ill.) 898.

Waiver of Lien.—One does not waive a bailee's lien on property of an insolvent by filing a claim for the amount of the lien in the insolvency proceedings, where the lien is asserted when the claim is filed. Knapp, Stout & Co. Company vs. McCaffrey, 52 N. E. Rep. (Ill.) 898.

Amount of lien for Towage.—One contracting to tow a raft of lumber to a certain point has a lien on a half of the raft, which, at the owner's request, was transported only a part of the way, for the prices agreed on for all his services. Knapp, Stout & Co. Company vs. McCaffrey 52 N. E. Rep. (Ill.) 898.

Lien for Towage Attaches Before Delivery.—One towing rafts of lumber under a contract making no provision for the time of payment is entitled to a lien on the lumber for his services, though customarily he received no pay until after delivery. Knapp, Stout & Co. Company vs. McCaffrey, 52 N. E. Rep. (Ill.) 898.

Enforcement of Lien.—One having a bailee's lien for towage on a raft of lumber floating in a river may sue in equity to determine his possession and lien, as against a pretended purchaser threatening to take away the raft, and an assignee for creditors of the bailor. Knapp, Stout & Co. Company vs. McCaffrey, 52 N. E. Rep. (Ill.) 898.

Injury to Seaman—Contributory Negligence.—A seaman who, contrary to express orders, places himself in a position where he is liable to injury from the giving way of the rope, which is so rotten that its unsafe condition is obvious, is guilty of negligence contributing to an injury so received. The Robert C. McQuillen, 91 Fed. Rep. 685.

Lien for Towage—Jurisdiction.—A purchaser of a raft of lumber obtaining an order in the suit by a bailee of the lumber to enforce his lien for towage, giving the purchaser a right to take the lumber away on executing a bond to secure a bailee, and thereby rendering the bailee powerless to reclaim the lumber, is estopped from asserting that the

admiralty courts alone have jurisdiction of the suit, though the bailee consented to the order, and it was stipulated when it was made that it should not affect the purchaser's right to question the court's jurisdiction. Knapp, Stout & Co. Company vs. McCaffrey, 52 N. E. Rep. (Ill.) 898.

Seaman—Wages While Disabled from Injury.—The negligence of a seaman, contributing to an injury, which made it necessary to put into port and leave him, does not debar him from recovering his full wages, which include all that would have accrued upon the completion of the voyage. The Robert C. McQuillen, 91 Fed. Rep. 688.

Stevedore's Customary Rates.—A provision in a charter party that the "customary rates" should be paid for stevedoring, and the evidence showing that there were no established customary rates for the goods and voyage in question; held, that a reasonable compensation only should be charged. Macy et al. vs. Perry, 91 Fed. Rep. 671.

Injury to Seamen—Assumed Risk.—The risk to a seaman of injury from perils of navigation, from the negligence of fellow servants, or from defects in tackle or other appliances, which are not obvious or discoverable by the exercise of reasonable care, is incidental to the employment, and is assumed by him. The Robert C. McQuillen, 91 Fed. Rep. 685.

Charter Party—Screwing Cotton.—Cotton in bales being screwed down in the hold for the purpose of enabling the charterer to carry a greater quantity of goods, the expense of screwing must be paid for by the charterer, in the absence of any clause in the charter party requiring that expense to be borne by the ship. Macey et al. vs. Perry, 91 Fed. Rep. 671.

Stranding—Unknown Rock.—It is the duty of a tug to take her tow by the usual channel course; the tug N. H. in passing through Quick's Hole, having gone considerably to the westward of the usual course and deviated from the sailing directions, and thereby run her tow upon a rock previously unknown to navigators, held, that the tug was liable. The Nathan Hale, 91 Fed. Rep. 682.

Equity Jurisdiction Over Lien for Towage.—Equity has jurisdiction to afford relief to a bailee of a raft having a lien for towage, where equitable circumstances exist, justifying the granting of relief on equitable principles, as against persons made defendants, though he might have obtained some relief by proceedings in admiralty against the raft. Knapp, Stout & Co. Company vs. McCaffrey, 52 N. E. Rep. (Ill.) 898.

Personal Injuries—Fellow Servant.—The libelant, who was working in the hold of the K., was hurt by some bags that fell from above while loading from a lighter, because

W. A. McGILLIS & CO.

DREDGING.

57 WADE BUILDING. CLEVELAND, OHIO.

the sling enclosing the bags was not tightly drawn. The stevedore's foreman, passing as the sling was going aboard, noticed that it was not very tight, and endeavored to make it tighter and then let it pass. There was no defect or imperfection in any of the tools, appliances or machinery on the ship, but the load was not heavy enough to draw the sling tight. The foreman's aid in tightening was only such as belonged to the workmen themselves to attend to. Held, that in this act the foreman was a fellow workman only, and his act or negligence did not make the ship liable. The Kensington, 91 Fed. Rep. 681.

Enlistment in Navy—Minor's Discharge—Under section 1419 of the Revised Statutes, enlistments in the navy of minors under 18 years of age are prohibited, without the consent of the parent or guardian. The applicant on applying to the enlisting officer stated that he was under 18, but that his parents were dead; the latter statement was untrue, and his father sought the son's discharge on habeas corpus. Held, that the enlistment was illegal, and the minor was discharged. In re Falconer, 91 Fed. Rep. 649.

Contract of Affreightment with Charterer.—Libelant contracted with a transportation company for the carriage of freight and passengers from Seattle to an Alaskan port, no vessel being specified. The company entered into a charter party with the claimants for the schooner Bella, but failed to comply with its terms to entitle it to possession, and never obtained possession, though it was permitted to build a new cabin on the vessel, and to place a purser on board, who made some arrangement for loading freight for libelant, but had not done so when the charter was abandoned by the charterer. Passengers of libelant's party had also visited the vessel and selected berths, but had not gone on board for purposes of the voyage. Held, that libelant was not entitled to a lien on the vessel for the breach of the contract by the transportation company. The Bella, 91 Fed. Rep. 540.

Seaworthiness—Stanchion Overweighted.—The steamship K. was chartered to convey a cargo of liquorice from Beyrout and Alexandria to New York. On sailing three out of four of the after-stanchions of the after-hatch in the lower hold were down, and the remaining fourth stanchion, during rough weather, broke a hole through the iron cover of the ballast tank on which it rested, causing a leak which damaged the cargo and necessitated repairs in Algiers, during which further damage was done to the cargo; the weight bearing on the single stanchion aft was increased by the stowage of a spare piece of shafting of three tons weight immediately over the stanchion and the lack of the additional support of the three other stanchions designed to be used, made the ship unfit for the voyage, and was bad loading, within the first section of Harter act, and not within the third section; and that the ship was liable for the damage. The Kate, 91 Fed. Rep. 679.

**CONDENSED STATEMENT OF LAKE COMMERCE
AT DULUTH AND SUPERIOR, DURING
NAVIGATION SEASONS.**

1895.

Number of vessels arriving, 5,505; registered tonnage, 5,665,752; number of vessels departing, 5,481; registered tonnage 5,778,520; total arrivals and departures, 10,986; total tonnage 11,444,272.

Receipts, net tons, 2,035,465; valuation, \$27,443,512; shipments, net tons, 4,289,886; valuation, \$67,556,488; total, net tons, 6,325,351; valuation, \$95,000,000.

1896.

Number of vessels arriving, 5,527; registered tonnage, 6,626,101; number of vessels departing, 5,421; registered tonnage, 6,726,967; total arrivals and departures, 10,948; total tonnage, 13,353,068.

Receipts, net tons, 2,407,880½; valuation, \$27,717,561; shipments, net tons, 5,478,953; valuation, \$83,959,339; total, net tons, 7,886,833½; valuation, \$111,676,900

1897.

Number of vessels arriving, 4,864; registered tonnage 6,342,118; number of vessels departing, 4,894; registered tonnage, 6,503,747; total arrivals and departures, 9,758; total tonnage, 12,845,865.

Receipts, net tons, 2,492,420; valuation, \$28,963,122; shipments, net tons, 5,982,804; valuation, \$89,588,063; total, net tons, 8,475,224; valuation, \$118,551,185.

1898.

Number of vessels arriving, 5,519; registered tonnage, 7,014,924; number of vessels departing, 5,351; registered

tonnage, 7,120,313; total arrivals and departures, 10,870; total tonnage, 14,135,237.

Receipts, net tons, 2,979,809; valuation, \$34,578,955; shipments, net tons, 7,147,452; valuation, \$108,064,065; total, net tons, 10,127,261; valuation, \$142,643,020.

Increase in valuation of lake commerce during 1898 as compared with 1897, \$24,091,835.

TOTALS FOR DULUTH IN 1898.

Receipts, net tons, 1,061,657½; valuation, \$18,380,315; shipments, net tons, 4,871,161; valuation, \$50,622,877; receipts and shipments, net tons, 5,932,818½; valuation, \$69,003,192; passengers arriving, 23,276; departing, 21,806; passengers arriving and departing, 45,082.

VESSELS RECORDED AT DULUTH CANAL IN 1898.

Entering, steam vessels, 2,745; sail and other vessels, 719; total vessels, 3,464; total registered tonnage, 4,368,800; departing, steam vessels, 2,702; sail and other vessels, 742; total vessels, 3,444; total registered tonnage, 4,429,207; total entries and departures, 6,908 vessels; registered tonnage, 8,798,007; average tonnage, exclusive of tugs, 1,399.

TOTALS FOR SUPERIOR IN 1898.

Receipts, net tons, 1,918,152; valuation, \$16,198,640; shipments, net tons, 2,276,291; valuation, \$57,441,188; receipts and shipments, 4,194,443; valuation, \$73,639,828; passengers arriving, 2,148; departing, 2,278; passengers arriving and departing, 4,426.

VESSELS RECORDED AT SUPERIOR IN 1898.

Entering, steam vessels, 1,802; sail and other vessels, 253; total vessels, 2,055; total registered tonnage, 2,646,124; de-

parting, steam vessels, 1,652; sail and other vessels, 255; total vessels, 1,907; total registered tonnage, 2,691,106; total entries and departures, 3,962 vessels; registered tonnage, 5,337,230; average tonnage, exclusive of tugs, 1,562.

VESSELS RECORDED AT WISCONSIN ENTRY IN 1898.

Entering, 767 vessels; registered tonnage, 789,776; departing, 656 vessels; registered tonnage, 854,098; total vessels, 1,423; total tonnage, 1,643,874.

Compiled from vessel reports made to the U. S. Engineer Office in compliance with the act of Congress approved Feb. 21st, 1891, issued from the office of Major Clinton B. Sears, Corps of Engineers, U. S. A., stationed at Duluth, Minn., March 13, 1899.

We have received a very handsome illustrated work which will appeal to all who love the sea and glory in the deeds of sailors. Mr. Rufus Zogbaum furnishes the illustration, and that well-known author of sea tales, James Barnes, the songs. It is published by Fredk. A. Stokes Co., New York, and is called "Ships and Sailors," and is, as its title shows, a collection of songs of the sea, "as sung by men who sail it." The illustrations are numerous and very fine; the songs are well selected, including those written by Mr. Barnes himself, and they are accompanied by music, making the work very complete in all respects. It contains twelve modern navy songs, twelve old sea songs, and nineteen patriotic songs. The talent of the authors in their several lines is undoubted and together they have produced a work which should find a place on every ship of our Navy.

TOBIN BRONZE

(Trade-Mark Registered.)

Tensile strength of plates one-quarter inch thick, upward of 78,000 lbs. per square inch. Torsional strength equal to the best machinery steel. Non-corrosive in sea water. Can be forged at cherry red heat. Round, Square and Hexagon Bars for Bolt Forgings. Pump Piston Rods, Yacht Shaftings, etc. Rolled Sheets and Plates for Pump Linings and Condenser Tube Sheets, Centerboards, Fin Keels and Rudders.

The Ansonia Brass & Copper Co.

SOLE MANUFACTURERS,

19-21 Cliff St., NEW YORK.

Send for Pamphlet.

S.F. HODGE & CO.

MARINE ENGINES,
PROPELLER WHEELS,
DECK HOISTERS,
MARINE REPAIRS.
312 ATWATER STREET,
DETROIT, MICH.

Chas. E. & W. F. Peck,

58 William Street, New York City.

Royal Insurance Building, Chicago, Ill.

C. T. BOWRING & CO.

5 and 6 Billiter Avenue, E. C.,

London, England.



BROWN & CO., - - - 202 Main Street, Buffalo, N. Y.
PARKER & MILLEN, 15 Atwater Street, W., Detroit, Mich.
J. G. KEITH & CO., - - 138 Rialto Building, Chicago, Ill.
LA SALLE & CO., Board of Trade Building, Duluth, Minn.

Are prepared to make rates on all classes of Marine Insurance on the Great Lakes, both CARGOES AND HULLS

Insurance Company of North America

CAPITAL, Paid up in Cash,	-	-	-	\$3,000,000.00
ASSETS,	-	-	-	10,173,488.90

CHARLES PLATT, President.
GREVILLE E. FRYER, Sec'y and Treas.
T. HOARD WRIGHT, Marine Secretary.

EUGENE L. ELLISON, Vice President.
BENJAMIN RUSH, Second Vice President.
JOHN H. ATWOOD, Assistant Secretary.

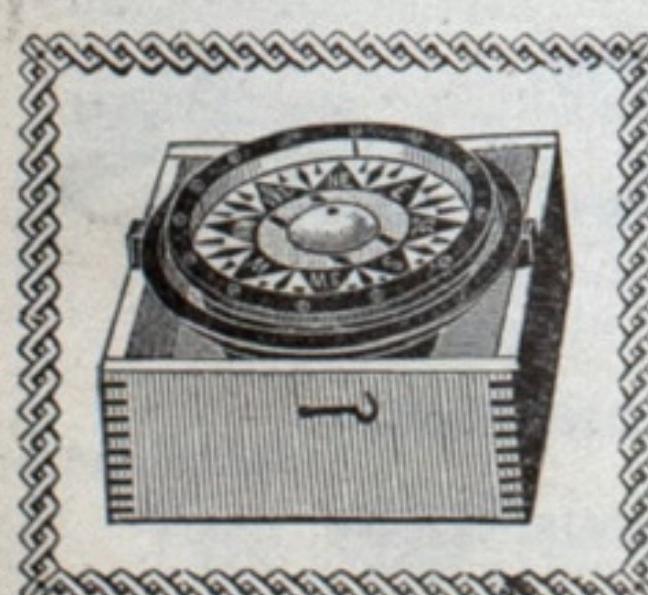
Lake Marine Department, GEORGE L. McCURDY, Manager.
CHICAGO, ILL.

MACHINERY FOR HANDLING SHIP PLATES, FRAMES, ETC., IN SHIP BUILDING. CRANES, ELECTRIC, STEAM AND HAND POWER.

The Brown Hoisting & Conveying Machine Co., = = Cleveland, Ohio, U. S. A.

NEW YORK, Havemeyer Building.
PITTSBURGH, Carnegie Building.

LONDON, 39 Victoria St.,
Westminster S. W.



THE Bliss

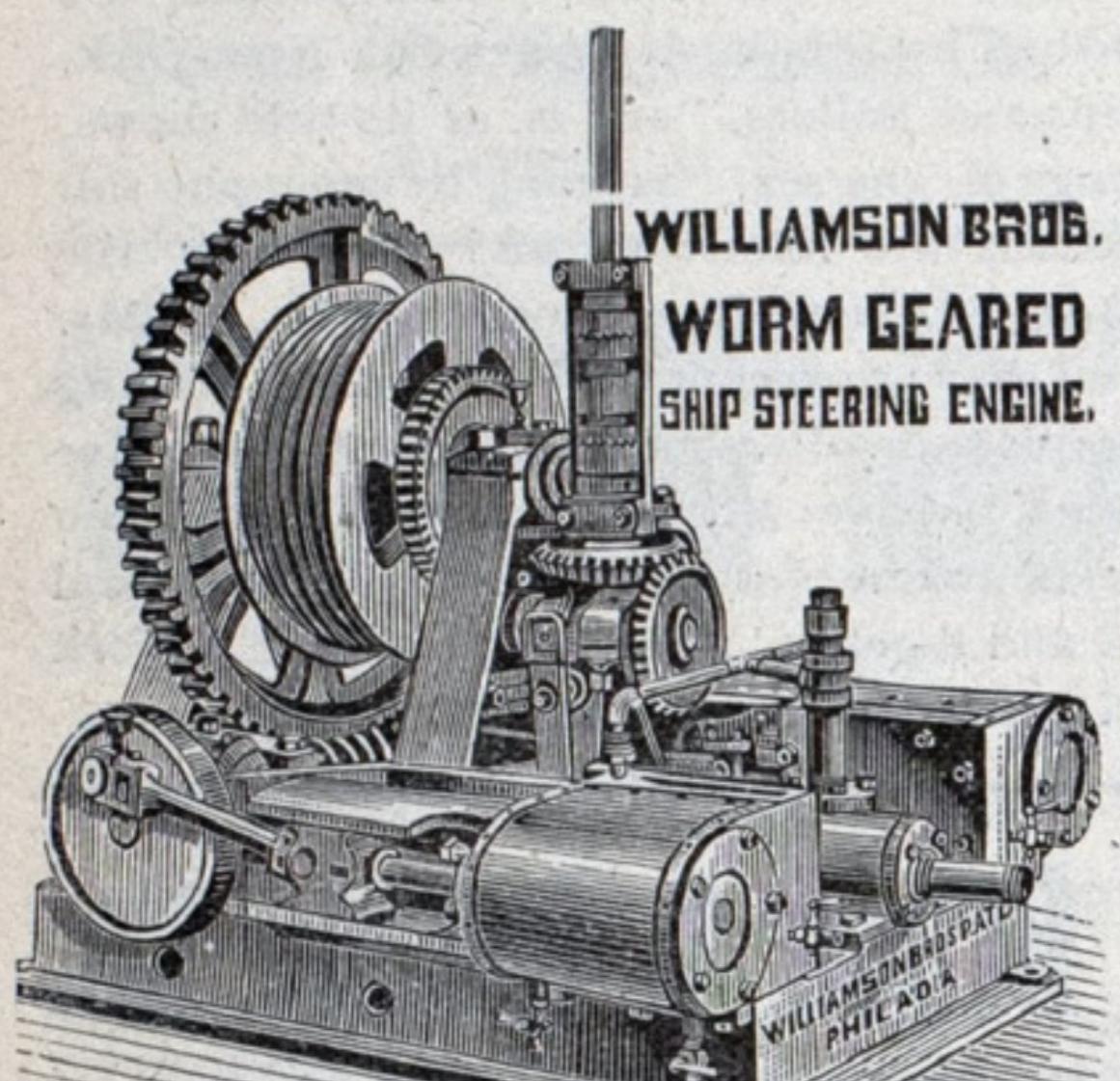
LIQUID (Spirit) COMPASS

Made in seven sizes by JOHN BLISS & CO.,
128 Front Street, New York, is finely finished
sensitive, accurate and durable. Moves quickly
and is extremely steady. Is the best Liquid Com-
pass ever made in this or any country. For sale
by ship chandlers generally.



WILLIAMSON BROS.

COR. RICHMOND AND YORK STS.,
Philadelphia, Pa.

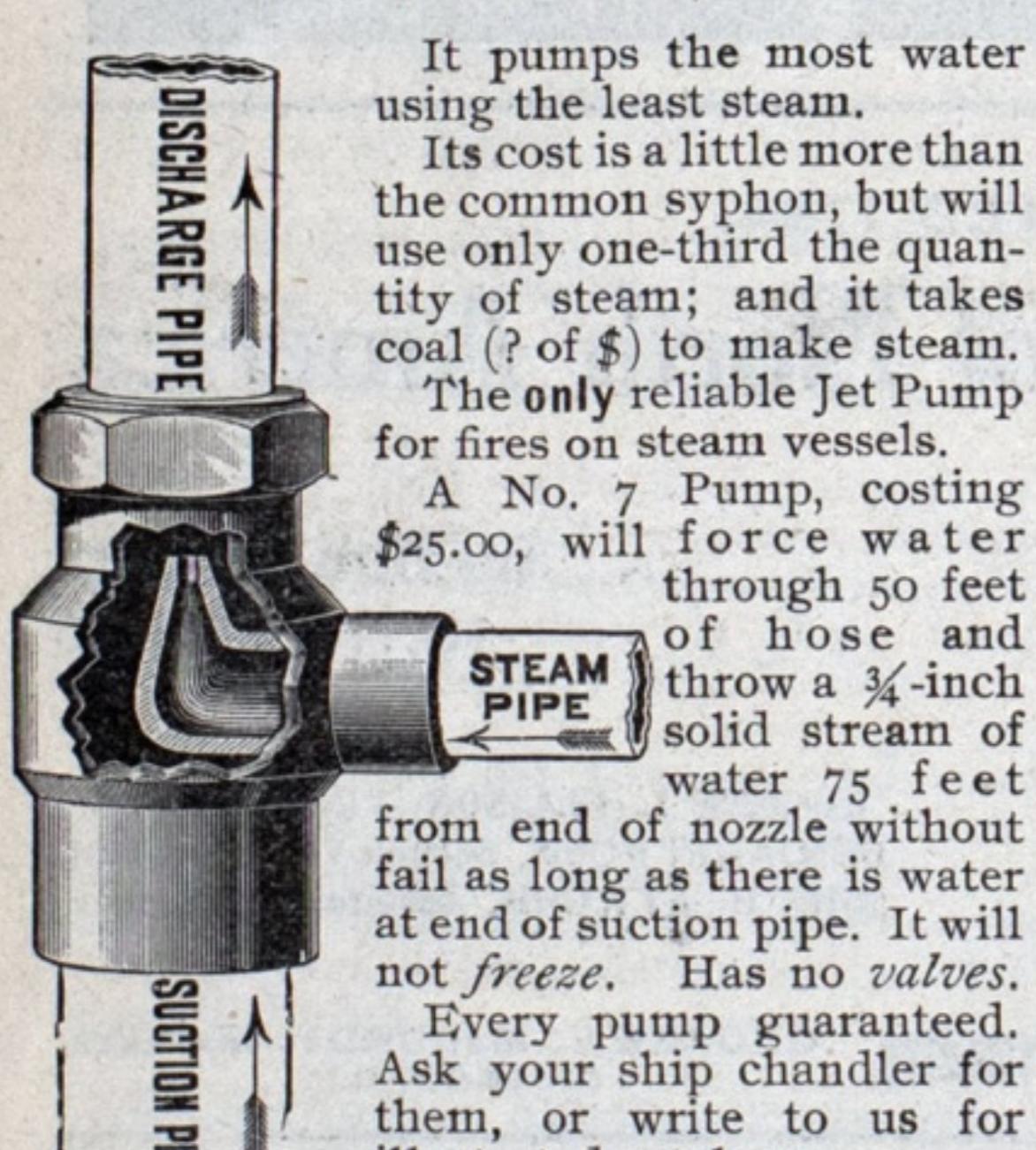


HOISTING and SHIP ENGINES
STEERING ENGINES.

With either Fractional, Spur or Worm Gear of
Various Patterns to Suit all Purposes.

Use the Vanduzen Steam Jet... **PUMP**

THE BEST STEAM JET PUMP IN THE WORLD.



THE E. W. VANDUZEN CO., CINCINNATI, O.

Youghiogheny River Coal Co.

Miner and Shipper of

OCEAN,
YOUNGIOHENY
GAS AND STEAM

COAL.

General Office:
Erie, Pa. Long Distance 'Phone 409.

Shipping Docks:
Ashtabula, O. Long Distance 'Phone 76.

VESSELS FUELED AT ALL HOURS

ELECTRIC LIGHT.

WITH OCEAN COAL ONLY,
BY STEAM LIGHTER OR CAR DUMP.

M. A. HANNA & Co.

COAL, IRON ORE AND PIG IRON.

Steamboat Fuel at Ashtabula.

Large Supplies of Best Quality.

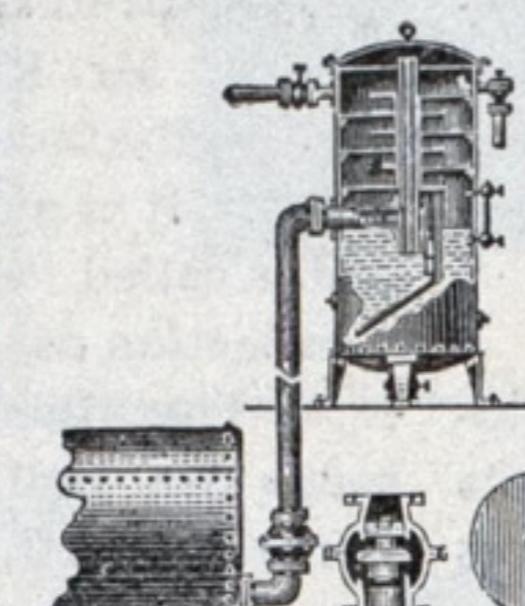
LIGHTER

carrying different grades
at all times.

MINERS AND SHIPPERS.

MAIN OFFICE, Perry-Payne Bldg., Cleveland, O.

Fuel scow with elevators and discharging spouts. Storage of 650 tons. Discharges 150 tons an hour into steamers while unloading cargo.



Buffalo Feed Water Heater AND PURIFIER.

Made in all Sizes and to Suit all Conditions.

ROBERT LEARMONT,
200 Bouck Ave., BUFFALO, N. Y.

PICKANDS, MATHER & Co.

PIG IRON.
IRON ORE AND COAL.

FUEL LIGHTERS

AT BUFFALO,
ERIE,
ASHTABULA,
AND CLEVELAND.

At DETOUR, MICH., A FUEL DOCK equipped with Shute capacity of 600 Tons.
Best Quality PITTSBURGH COAL furnished at any time during Day or Night.

WESTERN RESERVE BUILDING, CLEVELAND, O.



Moore's Anti-Friction
Differential Chain

HOIST

Adjustable Automatic Brake.
Self-sustaining at every point
Highest Efficiency.
A New Movement.
A Perpetual Compound Lever
Powerful, Simple and Durable
Light, Compact and Strong.

11 SIZES.

Half-Ton to 15 Ton Capacity.

Compressed Air Motor
Cranes and Hoists.
Hand Power Cranes,
Trolleys, Etc.

Chisholm & Moore Mfg. Co.

CLEVELAND, OHIO.

Compasses Adjusted

For deviation, and deviation tables supplied. Great facilities for doing the work by day or night.

John Maurice.

Office, 24-26 Market St., CHICAGO.

WRECKER'S AIR BAGS.

1,000 tons lift ready. Express anywhere. Rent moderate.

Hose, Belting, Packings. Full line Best Rubber. Factory prices.
MINERALIZED RUBBER CO., NEW YORK.

The Cuddy-Mullen Coal Co.

Miners and
Shippers of

STEAM COAL

FUELING DEPARTMENT FACILITIES.

CLEVELAND HARBOR.—Car Dumper; Eight Pockets, 1000 Tons Capacity; Lighter Steam Derricks.

DETROIT RIVER BRANCH.—Amherstburg: Four Pockets; Three Steam Derricks
SANDWICH—Fourteen Pockets and Two Steam Derricks.

"SOO" RIVER BRANCH.—Two Docks, (Formerly known as the Anthony and Watson Docks,) Equipped with Pockets and Steam Derricks.

GOOD
COAL.

COURTEOUS
ATTENTION

QUICK
DISPATCH.

General Offices, Perry-Payne Bldg., Cleveland, O.

THE W. L. SCOTT COMPANY,

ERIE, PA.

WHOLESALE DEALER IN
Shamokin, Wilkesbarre ANTHRACITE.
Youghiogheny, Mansfield, PITTSBURG.

Vessel Fueling a Specialty

by steam lighter or car dump,
at all hours. Electric light.

MAIN OFFICE: SCOTT BLOCK. LONG DISTANCE 'PHONE 440.

FUELING OFFICE: CANAL DOCK. LONG DISTANCE 'PHONE 320.

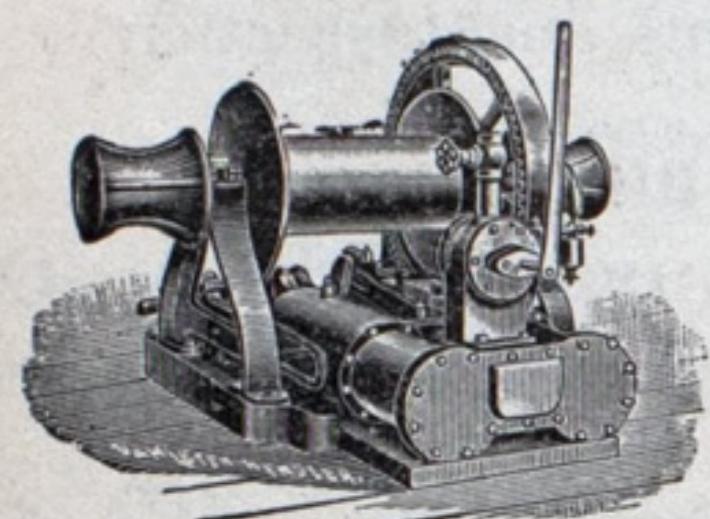
...Coals

**Steamboat Fuel at Chicago.**YOUGHIOGHENY and
LEHIGH COAL CO.J. T. CONNERY, Manager. ARCHIE J. HITCHCOCK, Dock Supt.
MAIN OFFICE: 1238-1242 Chicago Stock Exchange Building.
Long Distance Telephone, Main 5049. 110 LA SALLE STREET.No. 1, Michigan Slip and Basin. Phone 3046, Main.
No. 2, N. Halstead St. Bridge. Phone 773, North.FUEL DOCKS: Equipped with 125 2-ton Buckets for
FUEL LIGHTER: Fueling anywhere in Harbor

WE PRODUCE OUR YOUGHIOGHENY COAL, AND GUARANTEE QUALITY.

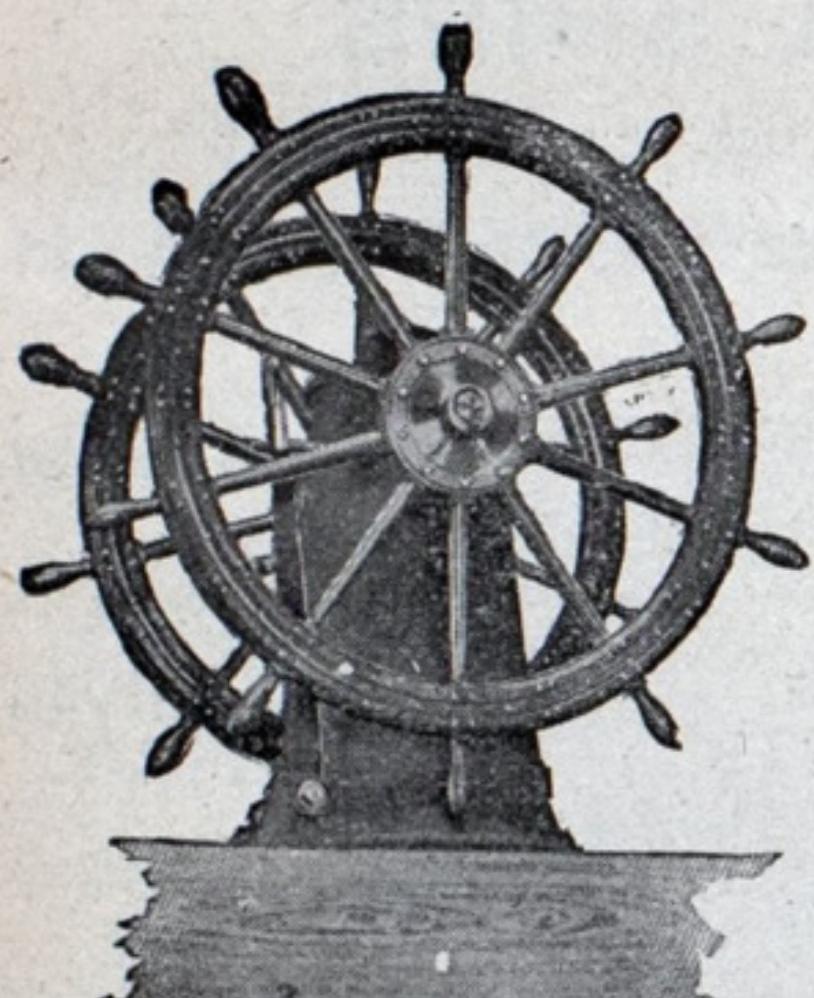
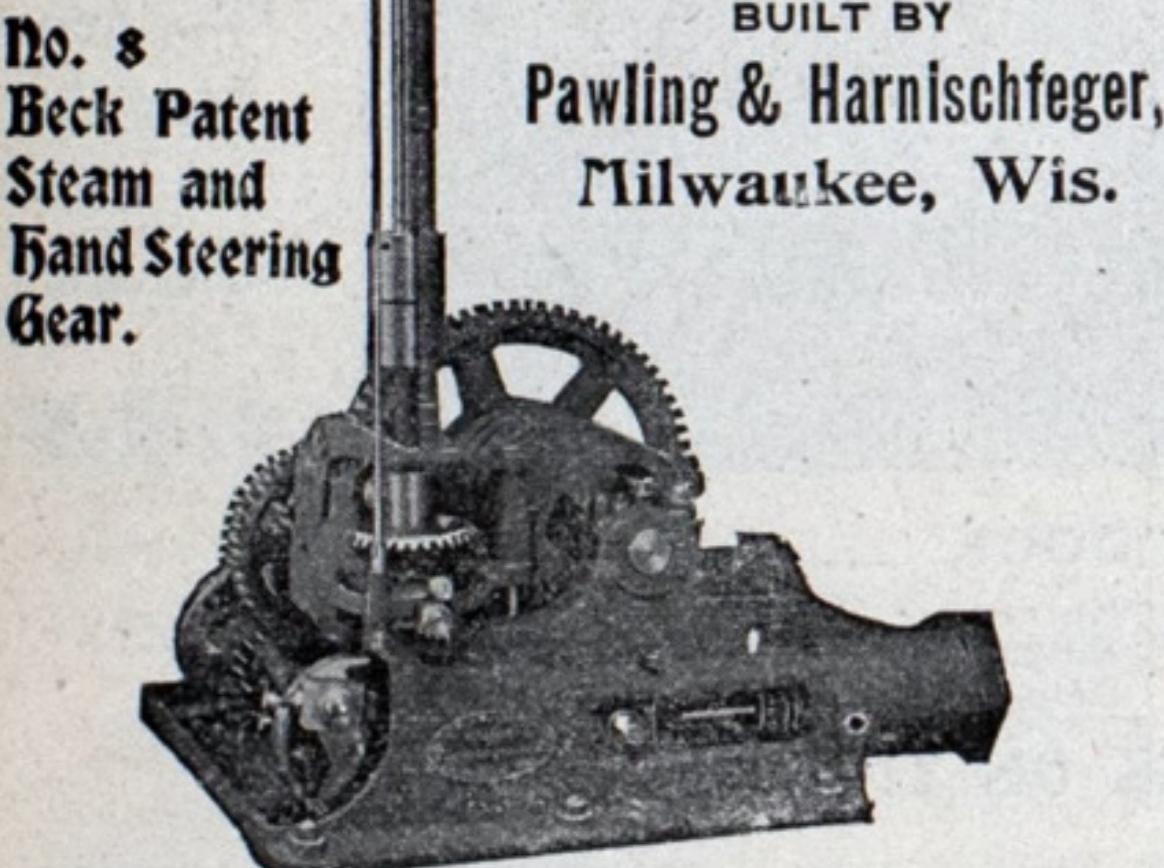
**THE CHASE MACHINE COMPANY,
ENGINEERS AND MACHINISTS.**MANUFACTURERS, UNDER THE CHASE PATENTS, OF
Fog Whistle Machines, Hoisting Engines, Steering Engines Automatic Towing Engines,
Power and Drop Hammers, and other Machinery. Engineers' Supplies and General Jobbing.

111 ELM STREET. TELEPHONE, MAIN 994. CLEVELAND, O.

**Dock and Deck Hoists**

ALL KINDS OF

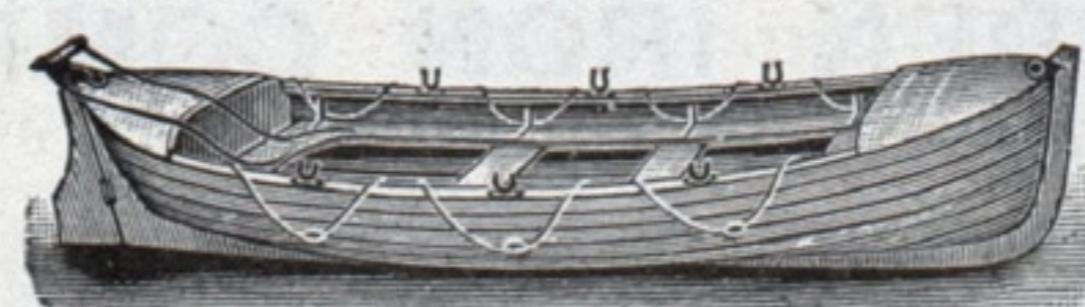
Machinery and Friction Hoists.

Send for Prices
and Circulars.JACKSON & CHURCH,
Saginaw, Mich.Simplest,
Strongest
and most
Reliable.
Changed
from Steam
to Hand or
back by one
lever in less
than one
Second.No. 8
Beck Patent
Steam and
Hand Steering
Gear.
BUILT BY
Pawling & Harnischfeger,
Milwaukee, Wis.**SEARCH LIGHTS.**

RUSHMORE PROJECTORS

are in almost exclusive use in
all classes of service, and are
specified for finest Steamers and
Yachts.Rushmore Dynamo Works,
Telephone, 559. JERSEY CITY, N. J.**Scott's Coast Pilot**FOR THE LAKES.
PRICE \$1.50.

For Sale by

The Marine Record,
Western Reserve Bldg.,
CLEVELAND.METALLIC
and
WOODEN
LIFE
BOATS.**Metallic Life Rafts, Marine Drags.**Manufacturer of Woolsey's Patent Life Buoy, which is the lightest,
cheapest and most compact Life Raft known. Send for illustrated cata-
logue. Get our prices before buying elsewhere.

D. KAHNWEILER'S SONS, 437 Pearl St., New York City.

**Steamboat Fuel at Cleveland.**THE PITTSBURGH &
CHICAGO GAS COAL CO.J. A. DONALDSON, Manager. N. J. BOYLAN, Fuel Manager.
OFFICE: 420-421 PERRY-PAYNE BUILDING.
TELEPHONE, MAIN 1888.No. 1, River Bed, through Valley R. R. Bridge. } Telephone,
No. 2, Main River, Foot of West River Street. } West 190.

300 Tons Capacity; Fuel Anywhere in the Harbor.

FUEL DOCKS:
FUEL LIGHTER:

WE PRODUCE OUR YOUGHIOGHENY COAL, AND GUARANTEE QUALITY.

John E. Thropp & Sons' Co.

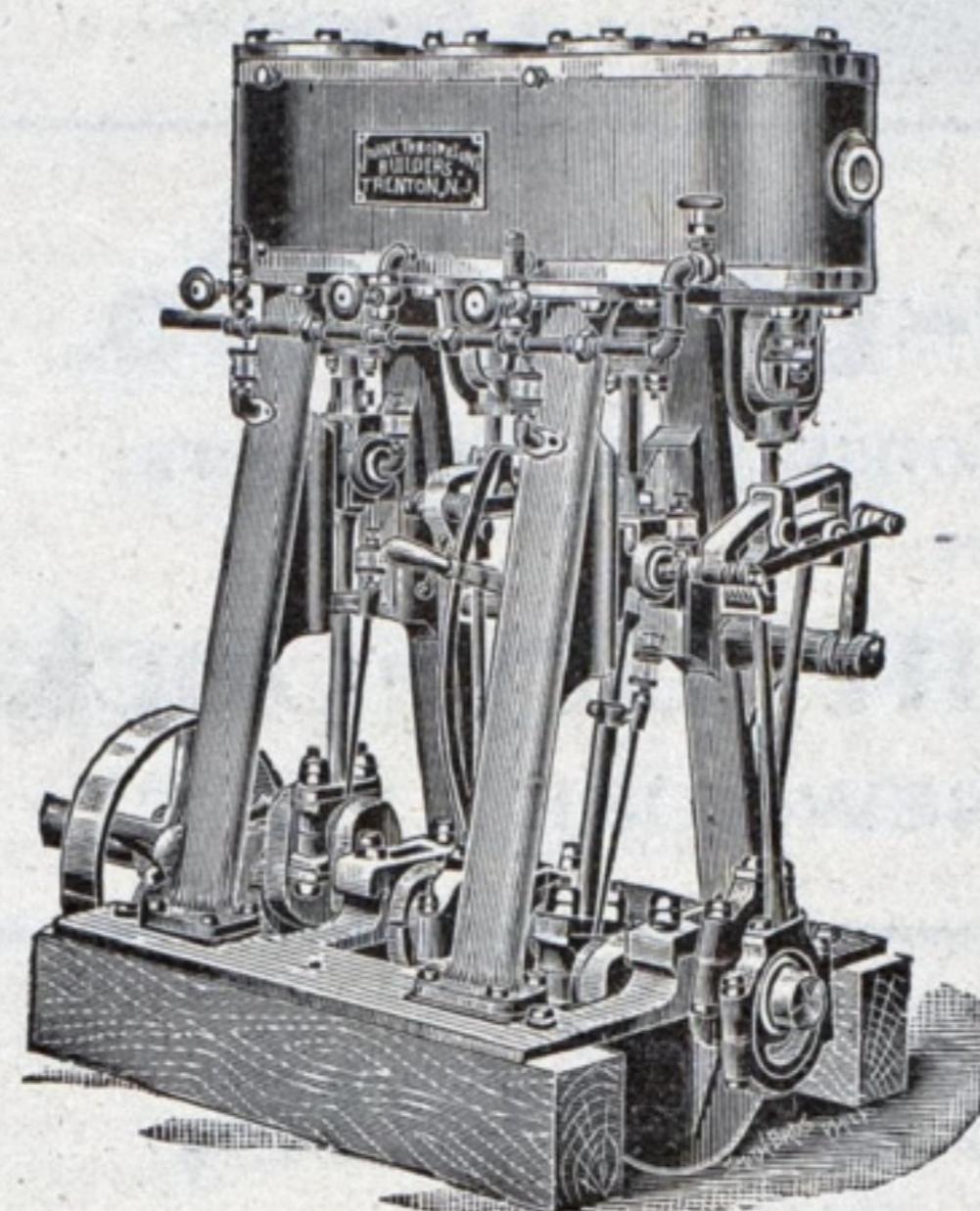
BUILDERS OF

Compound and Triple Expansion

ENGINES,Boilers, Surface Condensers, Propeller
Wheels, Etc.Contracts taken for yachts and tugs
complete. Send for photographs of En-
gines and descriptive pamphlet.

Works on Delaware & Raritan Canal Basin.

TRENTON, N. J.

**THE KENNEY FLUSHOMETER**

FOR FLUSHING WATER CLOSETS.

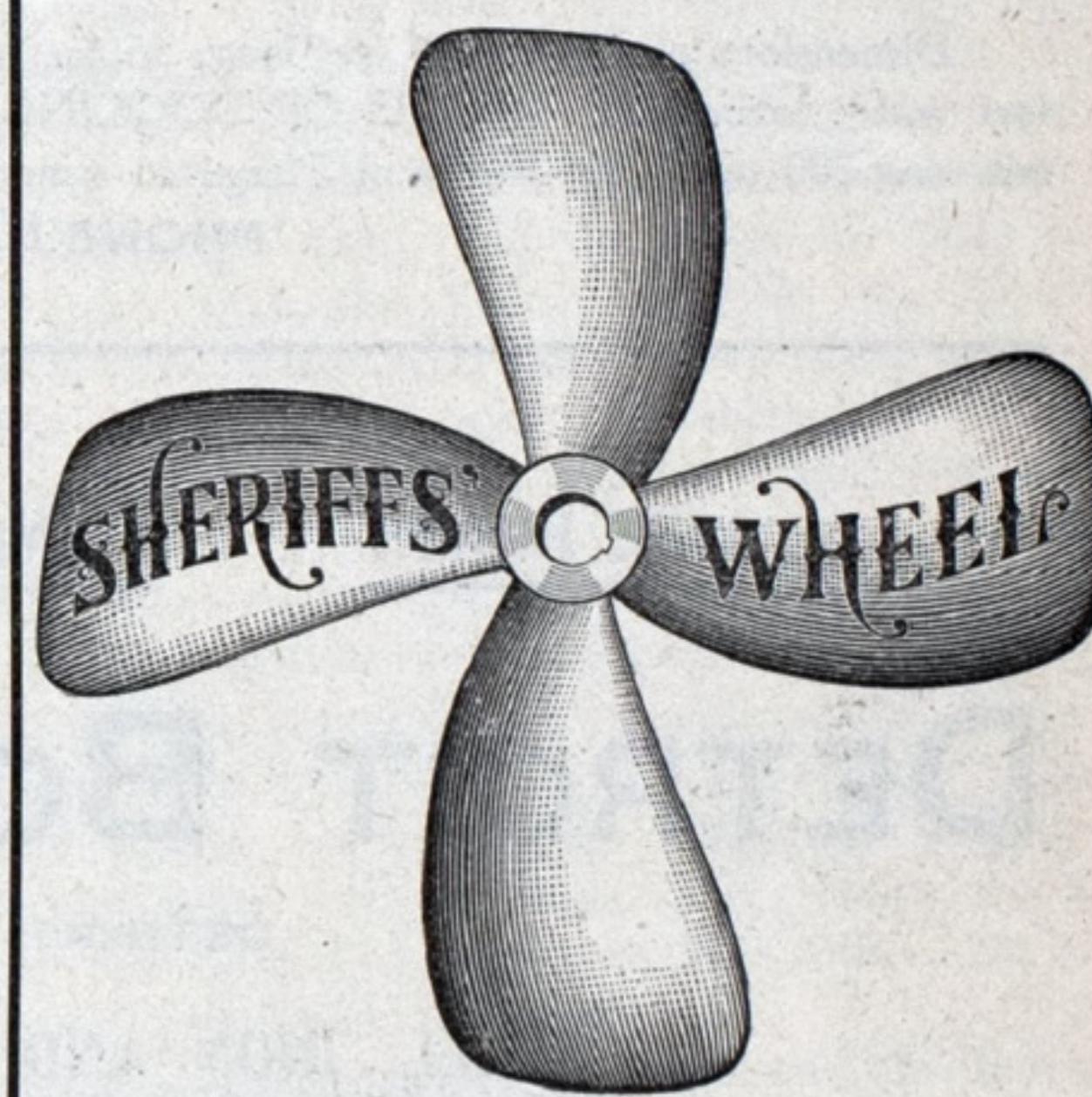
Takes the place of the noisy and dirty overhead
flush tank, and is**THE BEST SYSTEM EVER INVENTED FOR USE
ON STEAM VESSELS.**Owners and constructors of Steamships, Yachts and
Steamboats have found it indispensable. Used by the U. S. War
and Navy Departments. Transport Mohawk, U. S. Cruiser Detroit,
U. S. Gunboat Amphitrite. Also Albany Day Line Steamers and
others.THE KENNEY FLUSHOMETER is patented and manufactured only by The Kenney
Co., who guarantee the successful operation of the system.SEND FOR
ILLUSTRATED PAMPHLET.

THE KENNEY COMPANY,

72 to 74 Trinity Place, NEW YORK.

**SHERIFFS MFG. CO.**

ESTABLISHED 1854.



MILWAUKEE, WIS.

DONNELLY CONTRACTING CO.

896 ELLICOTT SQUARE,

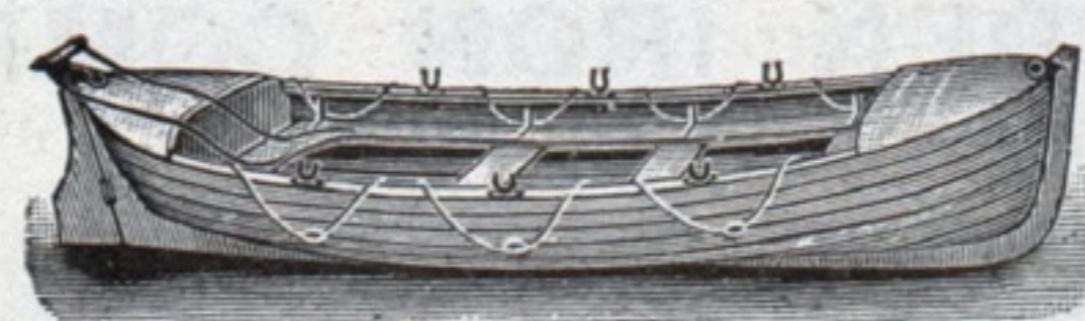
BUFFALO, N. Y.

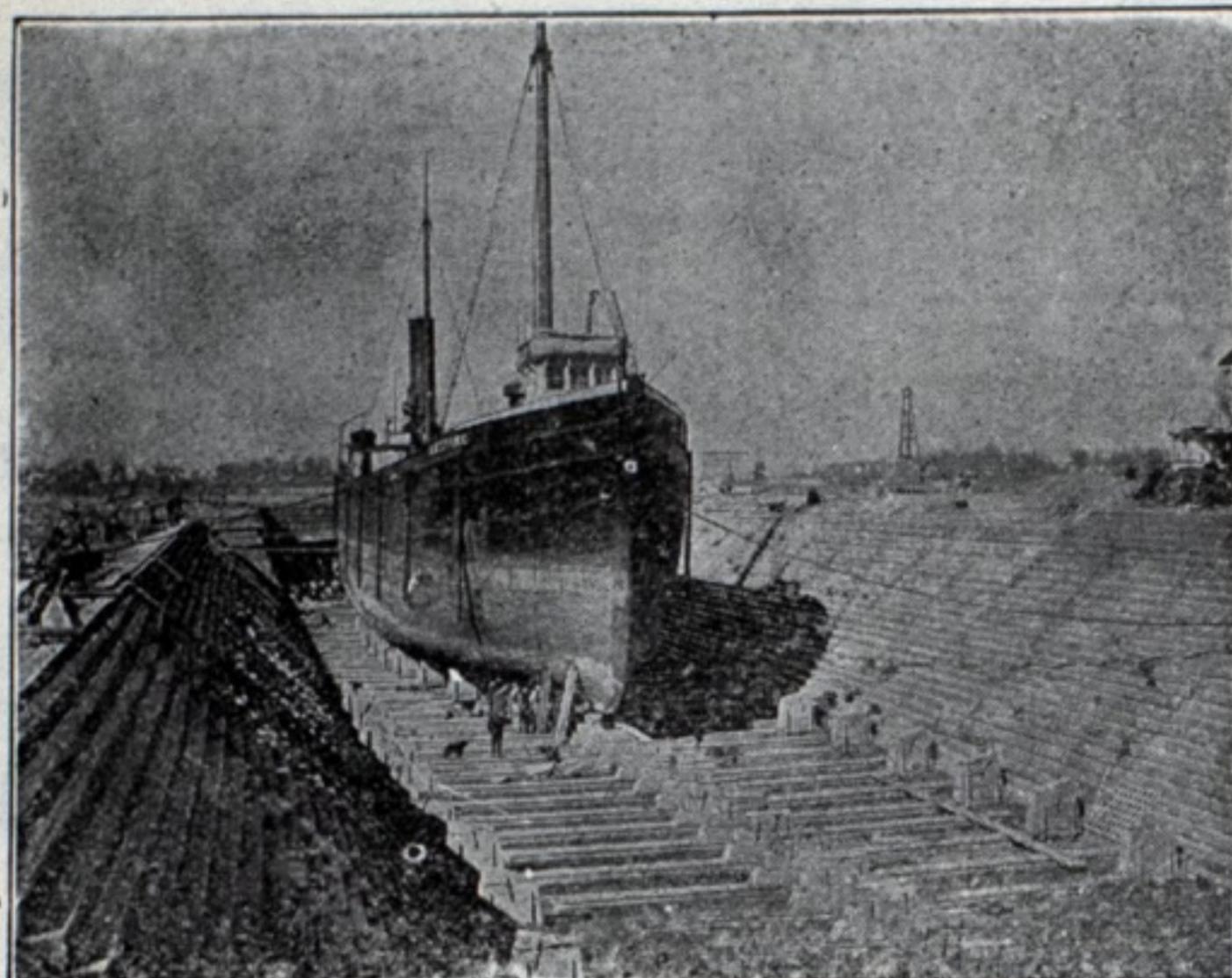
CONTRACTORS AND CONSULTING ENGINEERS,
HARBOR AND CANAL WORKS, ETC.**NEVERSINK CORK JACKET AND LIFE BELT.**Warranted 24 lb. Buoyancy and full Weight of Cork, as required by U. S. Inspectors. **Consolidated Cork
Life Preservers.** Superior to all others. **Rings Buoys and Fenders.** SAFEST CHEAPEST.

Approved and adopted by U. S. Board of Supervising Inspectors.

Also adopted by the principal Ocean, Lake and River Steamer Lines as
the only Reliable Life Preserver. Vessels and trade supplied. Send for
Catalogue.

Awarded four medals by World's Columbian Exposition.

METALLIC
and
WOODEN
LIFE
BOATS.**Metallic Life Rafts, Marine Drags.**Manufacturer of Woolsey's Patent Life Buoy, which is the lightest,
cheapest and most compact Life Raft known. Send for illustrated cata-
logue. Get our prices before buying elsewhere.For Stationary, Portable,
Traction Engines, Tugboats, &c.
Thoroughly Reliable—Perfectly Automatic.
JENKINS BROS. — Selling Agents,
NEW YORK, BOSTON, PHILA., CHICAGO.



Craig Ship Building Co.

TOLEDO, OHIO.

Metal
and Wooden
Ship Builders.

New Dry-Dock 450 feet long, 110 feet wide on top, 55 feet wide on bottom, 16 feet water on sill.

Repairs to Metal and Wooden Ships a Specialty.

Simpson Dry-Dock Co.

General Contractors and Consulting Engineers,

BUILDERS OF

Simpson's Patent Dry-Dock,

35 BROADWAY, NEW YORK.

A. Gilmore's Sons,

Dry-Docking,
Ship Building and
Repairing.

EAST SIDE, NEAR IRONVILLE, - - - - TOLEDO, O.

Dimensions of Dock, 236 feet long, 55 feet wide at top and 37 feet wide at gate. Nine feet water over sill. RATES OF DOCKING, Ten Cents per registered gross ton for vessels over 200 tons. Jig Mill and Planer in connection with Dock.

PHONE NO. 157.

LIFE BOATS.

YAWLS.

LIFE RAFTS.

DETROIT BOAT WORKS

DETROIT, MICH.

STEEL, IRON AND WOODEN TUGS.

STEAM AND SAIL YACHTS.

ALL KINDS OF PLEASURE BOATS, FISHING AND HUNTING BOATS,
SHILLS, BARGES, GIGS AND CANOES.

SAFETY HOLLOW STAYBOLT IRON,

Manufactured from

BEST QUALITY STEEL OR CHARCOAL IRON,

Guaranteed to meet Government Specifications and Inspection.

FALLS HOLLOW STAYBOLT CO.,

Cuyahoga Falls, O.

Write for Samples and Prices.

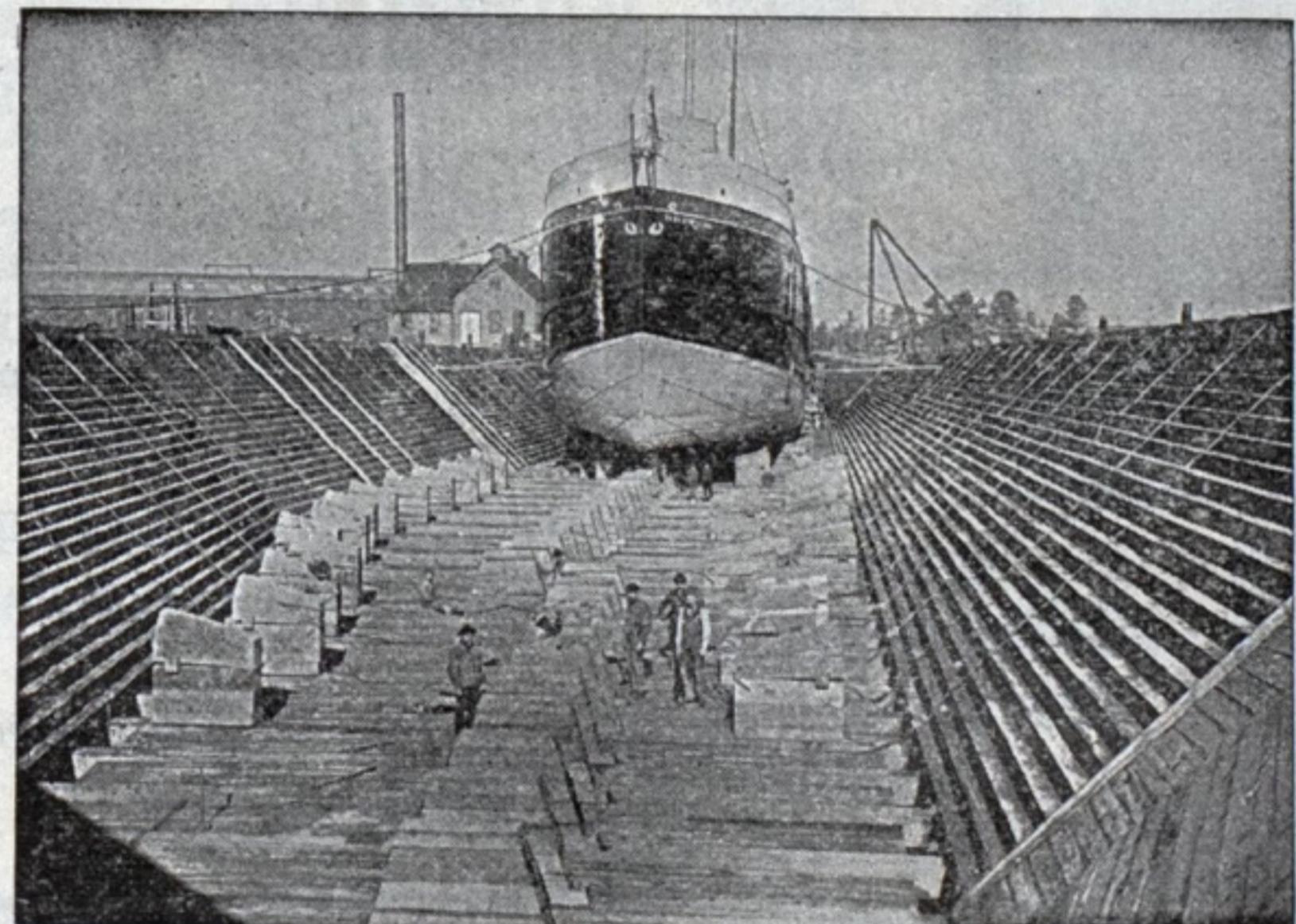
American Steel Barge Co.

STEEL AND METAL SHIPS

Of all Classes built on shortest possible notice at our yards at
WEST SUPERIOR, WIS., and also at EVERETT, WASH.

PHOTOGRAPH OF 300-FOOT BOAT IN DOCK.

Plates and Material always on hand to repair all kinds of Metal Ships in Shortest Time.



Best Quality of Oak in Stock for Repairing Wooden Vessels of all Classes.

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "

Length, Extreme.....	587 feet.	Entrance, Top.....	55 feet 9 in.
Breadth, Top.....	90 " 4 in.	Entrance, Bottom.....	50 "
Breadth, Bottom.....	52 "	Depth over Sills.....	18 "